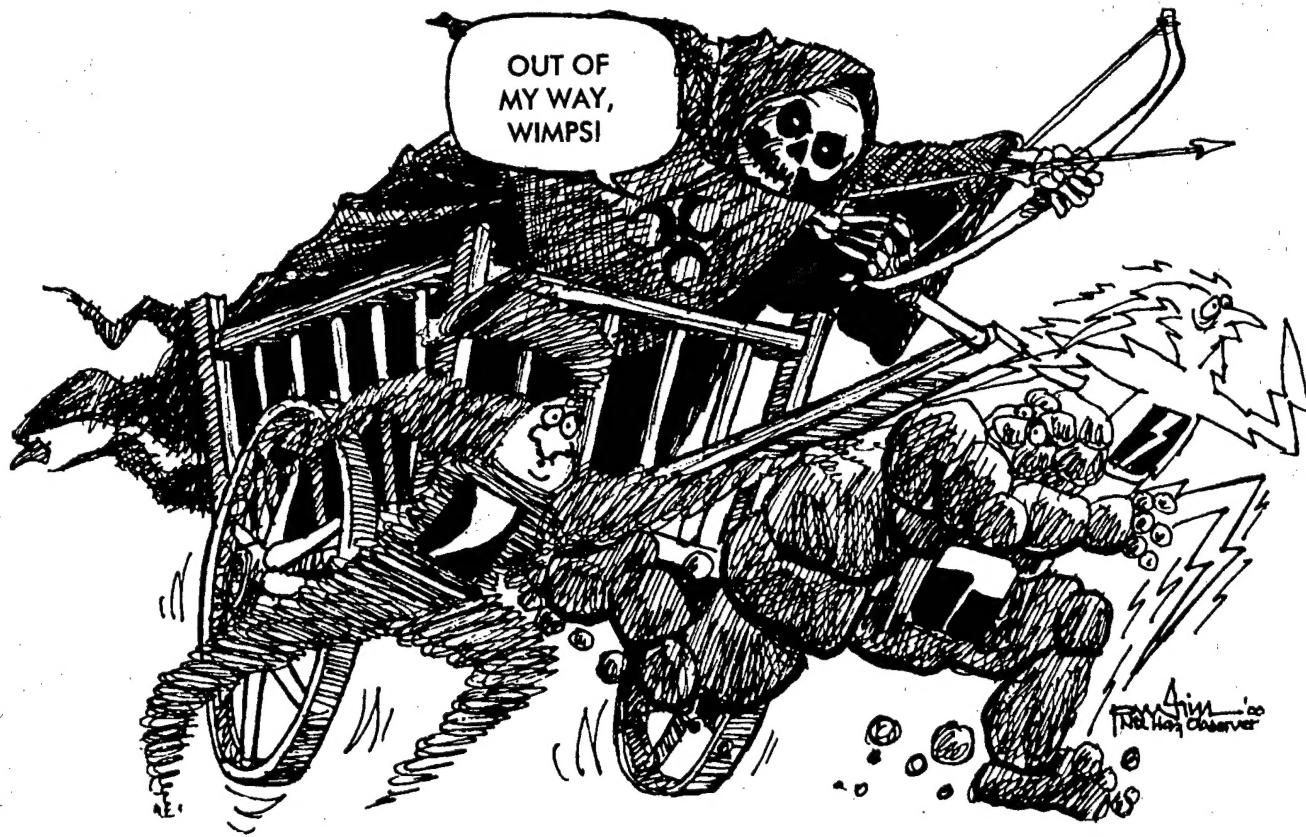


Natural Hazards Observer

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Biological Agents as Natural Hazards and Bioterrorism as a "New" Natural Disaster Threat

—an invited comment

Biological weapons represent a unique "natural" hazard. The pathogens involved are natural in the sense that they are risks that naturally occur in our environment. However they are unnatural in the way in which they are inflicted upon society.

Not a New Hazard

Despite their current notoriety, biological weapons are not new. Two of the earliest reported uses occurred in the 6th century B.C., when the Assyrians poisoned enemy wells with rye ergot, and Solon used the purgative herb hellebore during the siege of Krissa. In 1346, plague broke out in the Tartar army during its siege of Kaffa in the Crimea. The

attackers hurled the corpses of those who died over the city walls; the plague epidemic that followed forced the defenders to surrender, and some infected people who left Kaffa may have started the Black Death pandemic that spread throughout Europe, killing one-third of the population.

Biological Weapons as Modern Instruments of War

In 1972, the United States and many other countries signed the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological [Biological] and Toxin Weapons and on Their Destruction, commonly called the Biological Weapons Convention. This

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treaty prohibits the stockpiling of biological agents for offensive military purposes and forbids research into offensive employment of biological agents. The former Soviet Union and the government of Iraq were both signatories to this accord, but despite this historic agreement, biological warfare research continued in both countries.

Since 1972, there have been several cases of suspected or actual use of biological weapons. For example, in late April 1979, an incident in Sverdlovsk (now Yekaterinburg) in the former Soviet Union appeared to be an accidental release of anthrax in aerosol form from Soviet Military Compound 19, a microbiology facility. Residents living downwind from this compound developed high fever and difficulty breathing, and a large number died; the final toll was estimated to be 200 to 1,000.

In August 1991, the first United Nations inspection of Iraq's biological warfare capabilities was carried out in the aftermath of the Gulf War. On August 2, 1991, the Iraqi government announced to leaders of the United Nations Special Commission that they had conducted research into the offensive use of *Bacillus anthracis*, *Clostridium perfringens* (presumably one of its toxins), and botulinum toxins. This was the first open admission of biological weapons research by any country in recent memory, and it verified many of the concerns of the international community. Biological agents were tested by the Iraqis in various delivery systems, including rockets, aerial bombs, and spray tanks.

Despite the Biological Weapons Convention of 1972, the threat of biological warfare has actually increased in the last two decades, with a number of countries continuing to conduct research on the use of these agents as offensive weapons. The extensive program of the former Soviet Union is now controlled largely by Russia, and the Russian government has stated that they will put an end to further biological research. However, the degree to which the program has been scaled back, if any, is not known. A senior bioweapons program manager who defected from the former Soviet Union in 1992 outlined a remarkably robust biological warfare program. There is also growing concern that the smallpox virus—eradicated in the late 1970s primarily through the enormous efforts of the U.S. Centers for Disease Control and Prevention (CDC) and the World Health Organization and now stored in only two laboratories at the CDC in Atlanta and the Institute for Viral Precautions in Moscow, Russia—may have been “bargained” away by desperate Russian scientists seeking money. An attack with an agent such as smallpox could pose threats to large populations because of the potential for person-to-person transmission, enabling spread to other cities and states. Such a disease would quickly become a nationwide emergency, with international involvement sure to follow.

Not surprisingly, there is currently intense concern about the proliferation or enhancement of offensive programs in several countries due to possible hiring of expatriate Russian scientists as well as a number of other conditions, including neglected security systems and unpaid and unemployed technical personnel with access to and knowledge of weapons of mass destruction. Reportedly, in January 1998 Iraq sent about a dozen scientists to Libya to help that country

develop a biological warfare complex disguised as a medical facility in the Tripoli area. In a report issued in November 1997, Secretary of Defense William Cohen singled out Libya, Iraq, Iran, and Syria as countries “aggressively seeking” nuclear, biological, and chemical weapons.

Biological Weapons as Instruments of Terrorism

In addition to biological agents as weapons of war, there is also increasing concern over the possibility of terrorist use of biological agents to threaten civilian populations. There have already been cases of extremist groups in the U.S. trying to obtain micro-organisms to use as biological weapons. Until recently, an attack on civilians with a biological agent was considered very unlikely; however, now it seems entirely plausible. Recent events indicate that neither arms control treaties nor the moral repugnance long associated with the use of biological weapons will deter their use as terrorist weapons. Some experts have stated publicly that it is no longer a matter of if but when such an attack will occur. They point to the accessibility of information on how to prepare biologic weapons (e.g., on the Internet) and to activities by groups such as the Japanese terrorist group Aum Shinrikyo, which, in addition to releasing nerve gas in Tokyo’s subway system, experimented with botulism and anthrax and vigorously sought to obtain the Ebola virus.

A New Hazard

Unfortunately a disaster caused by the intentional release of biological weapons would be very different from other natural or technological disasters, conventional military strikes, or even attacks with other weapons of mass destruction (e.g., nuclear, chemical, or explosive). For example, when people are exposed to a pathogen such as plague or smallpox, they may not be aware of their exposure, and they may not feel sick for some time, although they would be contagious. Indeed, the incubation period may range from several hours to a few weeks, and consequently, an attack would not become obvious for a similar period. By that time, modern transportation could have widely dispersed the pathogen and greatly expanded the population of victims, perhaps exponentially.

Moreover, unlike an explosion or a tornado or an earthquake, in a biological event, it is unlikely that a single location or cluster of people will be identified for traditional first response. The initial responders to a biological disaster will most likely include county and city health officers, hospital staff, members of the outpatient medical community, and a wide range of response personnel in the public health system and *not* traditional first responders such as police, fire, rescue, and ambulance services.

Unfortunately, few American physicians have ever seen a case of smallpox, or anthrax, or plague, and diagnosis of an epidemic is certain to be delayed. Laboratory capabilities for diagnosis and measuring antibiotic sensitivity of organisms are similarly limited and would cause further delays.

Few, if any, recent disasters on American soil have resulted in the large numbers of patients needing immediate

and sustained medical care that would probably result from an epidemic due to an intentionally released virulent biological agent. It is hard to identify a modern disaster that has tested the capacity of the U.S. health care system to deal with something comparable to an attack on a U.S. city with an aerosolized anthrax weapon. Clearly, should such an attack occur, hospitals would be frontline response institutions, with hundreds, thousands, or perhaps even tens of thousands of people requiring immediate and/or intensive care. Yet, hospitals in the U.S. are already overburdened, over-occupied, and understaffed, and thus ill prepared to deal with a mass disaster. In addition, in any event involving biological weapons, the number of people actually ill and in need of hospital care would likely be exceeded by the number seeking care because they were fearful of being sick. (The Scud missile attacks on Israeli citizens during the Gulf War produced large numbers of people seeking medical care for symptoms of acute anxiety—symptoms that closely mimic the early effects of nerve gas.)



Additionally, in their initial stages, many of the diseases delivered by biological weapons resemble common illnesses. Rapid diagnostic tests for smallpox, anthrax, etc. would be most helpful, but even their availability would not obviate the need to distinguish the truly sick from the worried well. Hence, triaging affected individuals in order to best deploy limited drugs and equipment will require significant hospital resources and skilled staff. Moreover, in the event that a bioterrorist attack employs a contagious pathogen, health professionals must be protected from the diseases afflicting their patients, and patients must be prevented from infecting others. Yet most hospital infection plans are capable of managing only a handful of infectious patients.

No one knows how people would react to a disaster caused by a deadly pathogen, but it is likely that some health care workers would leave their jobs to care for their families; others would leave for fear of their own safety. Maintaining security at hospitals, health care centers, and pharmacies would pose great challenges since many hospital security staff are off-duty police officers who would presumably be needed elsewhere during the crisis.

At the same time, media coverage of modern epidemics (as has occurred with the West Nile Fever, Hantavirus, Swine Flu, Legionnaire's Disease, etc.) will have a profound influence on the response to a biological attack. It is

easy to imagine the opportunities for misinformation or contradictory interpretations by various self-appointed or media-anointed "experts." The situation could certainly lend itself to fueling public mistrust, whereas providing the public with accurate, timely information that people not only believe, but act on, could literally save lives.

Planning a response to terrorist attacks or biological disasters must not neglect the social consequences of epidemics. Unlike most "natural disasters," deliberate epidemics may continue to produce victims over a period of weeks or months, and additional attacks must be anticipated. If the biological weapon is a contagious disease, fellow citizens may represent ongoing threats to public safety, or be perceived as such. Thus the attack would exact a physical and emotional toll on the whole population, but, again, especially on health care workers and family caretakers. Normal routines and commercial activity are likely to be seriously disrupted, possibly on a city-wide or regional basis and for an extended period. Proper attention to the psychological needs of people in crisis will be essential.

Historically, some disease control measures taken in times of public health emergencies have been at odds with, or perceived as violating, certain democratic principles and processes. For example, mandatory quarantine, enforced vaccination to limit disease spread, and imposition of martial law have been perceived as threats to individual freedom and the right to privacy, or as discriminatory actions against certain groups. During a crisis, communication failures among different communities and between government officials and citizens can create suspicions and resistance to public health response measures. Moreover, differing ideas of what constitutes proper response can also have long-term political consequences, contributing to distrust of government institutions and disengagement from the processes of representative democracy. A bioterrorist attack will undoubtedly raise many important political, legal, moral, and ethical issues involving civil liberties, the authorities of state and federal health officials, and liability in the event mass vaccination is necessary. An effort to identify and better understand such issues is important.

In conclusion, the best public health measures to protect, respond to, and defend against the adverse health effects of biological terrorism or disasters due to deadly pathogens are the development, organization, and enhancement of life-saving public health tools. Planning and training involving all organizations potentially involved in responding—from emergency managers to public health officials to hospital administrators and staff—is essential. Expanded public health laboratory capacity, increased surveillance (disease monitoring) and outbreak response capacity, and health communication and training, with focused public health preparedness resources at the state and local level, are necessary to ensure that we will be able to respond effectively to this unique "natural" disaster.

Eric K. Noji
Bioterrorism Preparedness and Response Program
Centers for Disease Control and Prevention
Atlanta, Georgia

A New Working Paper on the Future of Emergency Management

The Natural Hazards Center has added a new working paper to its Web site:

Working Paper #104: *Emergency Management in the 21st Century: Coping with Bill Gates, Osama bin-Laden, and Hurricane Mitch*, by Claire B. Rubin — <http://www.colorado.edu/hazards/wp/wp104/wp104.html>.

In 1998 disaster researcher Claire Rubin published a working paper on the hazards we can expect in the future, *What Hazards and Disasters are Likely in the 21st Century—or Sooner?*, Natural Hazards Working Paper #99 — <http://www.colorado.edu/hazards/wp/wp99.html>. Working Paper #104 complements that earlier essay by addressing other factors that will affect how we deal with future disasters—from new technology, to terrorism, to the internationalization of disaster management.

Although she focuses on problems, Rubin also cites positive changes in disaster management, such as the use of the Internet, that have aided emergency managers in recent years. Still, her primary message is that a key to effective disaster management remains adaptability in the face of ever-more-rapid change. She concludes with several recommendations to make adaptation easier: the formation of an “Expert Panel on the Future of Emergency Management” to serve as an advisory committee to the many agencies involved in the discipline; the development of a “National Strategy for Emergency Management”; and the promotion of an entrepreneurial climate and funding within the emergency management community to support the creation of new methods and new technologies.

A complete list of Quick Response reports is posted at <http://www.colorado.edu/hazards/qr/qr.html>. Printed copies can be purchased for \$5.00 each, plus shipping charges (\$4.00 for surface mail to any destination; and \$9.00 for international air printed matter). Orders should be directed to the *Publications Clerk, Natural Hazards Research and Applications Information Center, 482 UCB, University of Colorado, Boulder, CO 80309-0482; (303) 492-6819; fax: (303) 492-2151; e-mail: janet.kroeckel@colorado.edu*. Prepayment is required, and checks should be payable to the University of Colorado.



A Modest Price Increase

Although the *Natural Hazards Observer* is free to anyone within the United States, readers outside the U.S. must pay a subscription fee. In January 2001, the subscription rate will increase from \$15.00 to \$24.00. All subscriptions will begin anew on January 1, and subscribers will be billed accordingly.

For further information about this increase, or to subscribe or renew a subscription, contact the *Publications Clerk, Natural Hazards Center, 482 UCB, University of Colorado, Boulder, CO 80309-0482; (303) 492-6819; fax: (303) 492-2151; e-mail: hazctr@colorado.edu*.

Introducing the Natural Disasters Roundtable

The National Research Council has established a Natural Disasters Roundtable as a “follow-on” activity to its former Board on Natural Disasters. The roundtable’s mission is to promote communication among scientists, practitioners, and policy makers in order to identify critical issues related to the understanding and mitigation of natural disasters. Roundtable meetings, to be held three times a year in Washington, D.C., will be open forums focusing on specific areas. A steering committee has been selected to identify those topics, create the agendas, and recruit expert speakers. The first meeting of the Natural Disaster Roundtable

will take place January 26, 2001. For more information see <http://nationalacademies.org/naturaldisasters>; interested persons can also contact *Patricia Jones, Natural Disasters Roundtable, National Research Council, 2101 Constitution Avenue, N.W., Washington, DC 20418; (202) 334-1964; fax: (202) 334-1961; e-mail: pjones@nas.edu*.



Introducing the APA Landslide Project

Recent trends in the U.S. suggest that more and more lands subject to landslides and earth failures are facing development. Whereas the land-use implications of other natural hazards, such as earthquakes and flooding, have received a fair amount of attention by government, landslide hazards have not. Complicating this problem, landslide-susceptible areas cannot be easily identified because they result from a combination of factors. Moreover, although a number of successful techniques for identifying and mitigating landslide hazards have been developed by the U.S. Geological Survey (USGS) and Federal Emergency Management Agency, this information has not always reached planners and other public officials dealing with the hazard.

To address these issues, the research department of the American Planning Association (APA) has embarked on a program to consolidate solutions from multiple disciplines to aid local planning. To launch this program and determine its scope and needed support, APA hosted a landslide symposium earlier this year in which participants proposed several products:

- A guidebook for local planners that will bring together the science, the practice, and alternatives for dealing with landslide hazards;
- A training and workshop program for local planners and planning commission members;
- A series of GIS and computer-based mapping and analytical tools with relevant national-level remote sensing data from the USGS and other agencies; and,



- A curriculum outline for use by planning schools to incorporate this topic into planning programs.

The APA plans to publish these products for a variety of audiences in a variety of ways, including an interactive Web site and CD-ROM.

Additional information about the APA Landslide Project is available from the *Principal Investigator, Landslides Project, Research Department, American Planning Association, 122 South Michigan Avenue, Suite 1600, Chicago, IL 60603-6107; (312) 431-9100; fax: (312) 431-9985; e-mail: landslides@planning.org; WWW: http://www.planning.org/landslides/index.asp*.

The Web site not only offers extensive information about this project, such as the draft table of contents for the proposed guidebook, but also information about landslides generally, including a computer simulation of an actual slide, links to a bibliography on landslides, and a page of links to other landslide information on the Web. Additionally, APA has created a "Landslides-L" mailing list for discussion about land-use planning for landslides, and subscription information is also available from the site.

Introducing the Global Earthquake Safety Initiative

The Global Earthquake Safety Initiative, established by GeoHazards International and the United Nations Center for Regional Development, focuses on helping cities around the world recognize and reduce the risk of loss of life due to earthquakes. Building on the work of the International Decade for Natural Disaster Reduction (IDNDR) RADIUS Project (see the *Observer*, Vol. XXIV, No. 4, p. 9), this new initiative has five objectives:



- To express the potential for loss of life due to earthquakes in an easy-to-understand form;
- To measure trends in a city's risk of life loss due to earthquakes and to identify broad causes of those trends;
- To produce a tool to evaluate the effectiveness of different mitigation activities;
- To identify the risk in public schools and methods for reducing that risk;
- To promote communication regarding earthquake risk reduction among cities around the world.

For more information about the Global Earthquake Safety Initiative, contact *Carlos Villacis, GeoHazards International, 200 Town and Country Village, Palo Alto, CA 94301; (650) 614-9050; fax: (650) 614-9051; e-mail: villacis@pangea.stanford.edu*.

[Adapted from *Disasters, Preparedness and Mitigation in the Americas*, a newsletter of the Pan American Health Organization]



ON THE LINE

Mount St. Helens What We've Learned 20 Years Later

Twenty years ago in late March, southwestern Washington's Mount St. Helens, a volcano in the Cascade Range, awoke from a 123-year slumber. Following two months of precursory activity—including sustained energetic seismicity, phreatic [steam-blast] explosions, and rapid bulging of its north flank from magmatic intrusion—Mount St. Helens erupted cataclysmically on the morning of May 18, 1980.

This eruption caused the worst volcanic disaster in the recorded history of the United States, resulting in 57 deaths, scores of injuries, and economic losses exceeding \$1 billion. Because it was thoroughly documented and received substantial media attention, the eruption and its aftermath ushered in two decades of heightened public awareness and expanded scientific studies, launching a veritable renaissance in volcanology that continues into the 21st century.

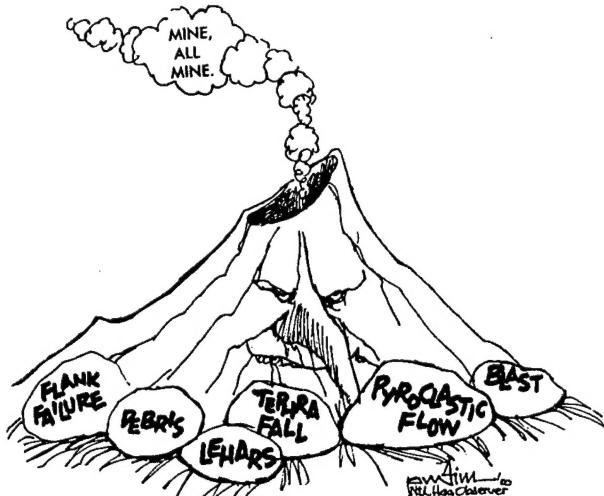
The reawakening of Mount St. Helens happened while I was head of the Volcano Hazards Program of the U.S. Geological Survey (USGS) and was thus responsible for directing the survey's scientific response to the eruption. The 1980 and subsequent eruptions of Mount St. Helens furnish many lessons, not only scientific findings germane to reducing volcano risk, but also lessons regarding the critical need for effective communication among scientists, emergency management officials, members of the media, and affected populations.

The Eruption

Seconds after a 5.1 magnitude earthquake, the north flank of Mount St. Helens began to collapse, unleashing a powerful, laterally directed blast, comparable in some ways to the sudden removal of the cap from a vigorously shaken bottle of soda. This collapse produced a rockslide-debris avalanche of 2.3 cubic kilometers, the world's largest in historical time. Although it lasted less than five minutes, the lateral blast traveled at speeds of up to 1,000 kilometers per hour, extending out as far as 28 kilometers and devastating 600 square kilometers of land north of the volcano. This blast, much more powerful than any other in the volcano's history, was the principal cause of fatalities.

Ash fallout from the eruption affected more than 57,000 square kilometers in eastern Washington and neighboring states. The ash cloud drifted across the country in three days and ultimately circled the globe in about two weeks.

Within 10 minutes of the eruption's onset, the interaction of hot volcanic ejecta with snow and ice triggered lahars (volcanic mudflows) that caused widespread flooding and damaged roads, bridges, and other structures.



Several compelling lessons from the Mount St. Helens eruption must not be forgotten:

- Volcano hazards can be multiple (e.g., flank failure, debris avalanche, lahar, lateral blast, pyroclastic flow, tephra fall, flooding, and sedimentation), and they can happen in a very short time, from tens of seconds to a few hours.
- Communities far distant from a volcano can also be vulnerable to damaging hazards.
- Prolonged, increased sediment transport following explosive eruptions can have socioeconomic and environmental consequences that are more severe than the direct consequences of the actual eruption.

Anticipating the Eruption

When activity began at Mount St. Helens in late March 1980, the USGS began intensive monitoring in cooperation with the Geophysics Program of the University of Washington. Data clearly indicated magmatic intrusion high into the volcanic edifice and the growing instability of the bulge on the north flank, but it was impossible to predict the onset of the paroxysmal events of May 18. Nevertheless, the monitoring data indicated to scientists that a flank failure might trigger a large magmatic eruption. Indeed, the on-site scientific team explained this scenario to emergency management officials before May 1.

Volcanologists now regard any significant rapid deformation of a volcano, as was well documented at Mount St. Helens, as a warning of a potential sector collapse and lateral blast.

A Successful But Imperfect Response

Besides monitoring the volcano around the clock, USGS scientists also worked daily with the U.S. Forest Service, the principal land manager for Mount St. Helens, as well as two counties and other government agencies, to provide updates of potential hazards and advice on mitigation and preparedness measures. By April 1, the USGS had developed a large-scale hazards zonation map and related hazards assessment information that were essential for preparing the Forest Service's Mount St. Helens Contingency Plan (which was completed April 9) and for locating roadblocks and

restrictions on public access. Had these measures not been taken, the eruption would have caused considerably more casualties.

However, while the USGS response to Mount St. Helens was successful overall, it was hardly perfect. Lack of equipment, along with logistical difficulties, meant geodetic measurements of the north flank (bulging at an average rate of about 1.5 meters per day) did not begin until mid-April, several weeks after the bulge was first recognized. We will never know how much difference, if any, earlier measurements might have made.

Why didn't the USGS and Washington State take more action before 1980? By repeating the baseline monitoring measurements that had been initiated in the early 1970s and by developing protocols for working with other agencies, private organizations, and the public, they could have prepared both earlier and better for a reawakening of Mount St. Helens. After all, the USGS knew of the potential hazards as early as the late 1960s. Moreover, in 1975 three USGS geologists (Crandell, Mullineaux, and Rubin) published in *Science*¹ a long-term forecast stating that Mount St. Helens would be the most likely volcano in the Cascade Range to reawaken, possibly even "before the end of the 20th century." In 1978, Crandell and Mullineaux published a detailed volcano hazards assessment that received little notice, but after the onset of activity in 1980 this report was widely read by scientists and emergency management officials.

The Survey's lack of preparation in part stemmed from insufficient funds for additional work in the Cascades—repeated efforts to obtain increased appropriations for volcano hazards studies had all failed. After the 1980 eruption, however, funding for the USGS Volcano Hazards Program increased significantly and was more than sufficient to establish the Cascades Volcano Observatory in Vancouver, Washington, to monitor Mount St. Helens and other Cascades volcanoes. The funding also expanded or initiated studies of other volcanoes in the U.S. The lesson is obvious and disturbing: justification for increased funding of volcano hazards studies is greatly strengthened—and perhaps only receives serious attention—following a volcanic crisis or disaster.

Ruiz and Pinatubo

Since 1980, scientists have made numerous advances in volcano monitoring. The scientific and public responses to two volcano crises outside the U.S.—Nevado del Ruiz (Colombia) in 1985 and Mount Pinatubo (Philippines) in 1991—underscore the lesson of Mount St. Helens regarding the need for effective communications among scientists, emergency responders, and the public.

On November 13, 1985, a very small amount of magma erupted from Colombia's Nevado del Ruiz volcano, triggering destructive lahars that killed more than 23,000 people. This tragedy could have been averted; a hazards zonation map had been prepared a month earlier and scientists had provided adequate warning that went unheeded.

The Ruiz disaster was the impetus for the International Association of Volcanology and Chemistry of the Earth's Interior to produce *Understanding Volcanic Hazards*, a

video that depicts the deadly outcomes of volcano disasters, and *Reducing Volcanic Risk*, a video that shows what communities can do to mitigate volcanic hazards.

The Ruiz experience also launched the Volcanic Disaster Assistance Program (VDAP) in 1986, which is jointly funded by the USGS and the Office of Foreign Disaster Assistance of the U.S. Agency for International Development. Once officially invited, a VDAP team can quickly deploy a mobile volcano observatory to help host countries respond to volcanic crises.

In contrast to the 1985 Ruiz catastrophe, the response of scientists and emergency management officials to the 1991 eruption of Mount Pinatubo in the Philippines saved thousands of lives and reduced economic loss by hundreds of millions of dollars. Fatalities directly attributed to Pinatubo numbered fewer than 300, thanks to the timely evacuation of 250,000 people. Scientists from the Philippine Institute of Volcanology and Seismology and the VDAP team educated local authorities and populations about the eruption and its potential hazards using a draft version of the *Understanding Volcanic Hazards* video that convinced local officials to order evacuations and the people at risk to comply.

Averting Volcanic Disasters

Some trends of the past two decades continue into this century, including the continued development and improvement of real-time volcano monitoring networks and methods, particularly the use of satellite technology. Worldwide eruption frequency (on average, about 60 volcanoes are active each year) is not likely to decrease in the foreseeable future. Thus, with continued growth in world population, economic development, and urbanization, the global risks due to volcanoes will become more acute. However, even as we look forward to continuing advances in volcanology and hazards studies, the 1985 Ruiz disaster provides a tragic reminder that good science alone is not enough. The greatest payoff in risk reduction will come from increased focus on the societal and human issues that emerge during volcanic crises and from developing or improving communication among scientists, emergency managers, representatives of the news media, educators, and the general public. The major challenge—indeed, the goal—for volcanologists and other scientists is to prevent volcanic crises from turning into volcanic disasters.

Robert I. Tilling
Volcano Hazards Team
U.S. Geological Survey
Menlo Park, California

1. *Science*, 1975, Vol. 187, No. 4175, pp. 348-411.

[Adapted and reprinted with permission from *Geotimes*, May 2000, © 2000, the American Geological Institute]

For further information about the USGS Volcano Hazards Program, contact the author at Volcano Hazards Team, U.S. Geological Survey, MS-910, 345 Middlefield Road, Menlo Park, CA 94025-3591; (650) 329-5235; fax: (650) 329-5203; e-mail: rtilling@usgs.gov or view the USGS Web site on volcanoes: <http://volcanoes.usgs.gov>.

WASHINGTON UPDATE

West Coast Likely to Experience Highest Earthquake Losses

According to the report *HAZUS 99: Average Annual Earthquake Losses for the United States* (2000, 40 pp., free), 84% of the annual earthquake losses in the nation are expected to occur in California, Oregon, and Washington, with California alone accounting for \$3.3 billion of the estimated total annual loss of \$4.4 billion.

HAZUS (Hazards U.S.) is the Federal Emergency Management Agency's (FEMA's) loss estimation methodology, created in cooperation with the National Institute of Building Sciences and used to develop this new loss model. It produces regional profiles and estimates of earthquake loss by geographic area as well as evaluates characteristics of the built environment and categories of loss. Incorporating probabilistic seismic hazard data provided by the U.S. Geological Survey and other data regarding geological conditions, economic factors, and location and size of potential earthquakes, HAZUS can calculate potential damage in an area as small as a census tract.



The earthquake loss estimates in *HAZUS 99* are annualized to factor in historic patterns of frequent smaller earthquakes with infrequent, larger events. The \$4.4 billion estimate is considered extremely conservative, according to the study's authors, and only includes capital losses due to lost or damaged buildings, contents, or inventories, and income losses. It does not cover damage and losses to critical facilities, transportation and utility lifelines, or indirect economic losses.

The study concludes that probable annual earthquake losses in the U.S. are almost equal to the losses experienced

from floods and hurricanes. Flood losses totaled \$52 billion annually from 1989 to 1998, according to the National Weather Service. For the same period, the National Climatic Data Center estimates the U.S. lost \$5.4 billion annually due to hurricanes.

HAZUS 99 is free. Copies can be obtained by calling *FEMA Publications*, (800) 480-2520, or by downloading the document from the FEMA Web: <http://www.fema.gov/pdf/FEMA366.pdf>.

GAO Suggests Changes to FEMA Disaster Relief Estimation Method

When a disaster occurs, FEMA's Disaster Relief Fund is the major source of federal disaster recovery assistance for state and local governments. The fund receives an annual appropriation of up to \$320 million, and emergency supplemental appropriations are often enacted in response to large disasters. Over the last 10 years, the fund received \$34 billion in regular appropriations and about \$24 billion in emergency supplemental appropriations. Because appropriations made to the fund are available until they are spent, the fund usually carries balances that are obligated to relief and recovery projects.

FEMA is required to report monthly to both the House and Senate Appropriations Committees on the fund's status, including funds available, obligations to date, remaining costs from past disasters, and anticipated costs of disasters that might occur in the remaining months of the fiscal year. In early 1999, FEMA projected a carryover of \$700 million at the end of fiscal year 1999. However, a month later, FEMA revised its monthly report to indicate a potential shortfall before the end of that fiscal year. As a result, a Senate subcommittee requested an evaluation by the General Accounting Office (GAO) of how FEMA determines funding requirements for the fund.

The results of that study can be found in *Disaster Relief Fund: FEMA's Estimates of Funding Requirements Can Be Improved* (GAO/RCED-00-182, 2000, 24 pp., free). The report reviews the accuracy and timeliness of FEMA's estimates of remaining costs for past disasters, the reasonableness of FEMA's approach to estimating the timing and cost of future disasters, and the impact of FEMA projects on the rate of obligating disaster relief funds. The GAO found significant differences between FEMA headquarters and its regional offices regarding the amount of obligated funds. At the same time, data used for the report were four to six weeks old. The GAO acknowledges, however, that FEMA has developed a new automated system to estimate disaster costs on a real-time basis. The report includes recommen-

dations for improving estimates of the costs of future disasters and expediting the closeout of funding for past disasters.

Copies of the report can be obtained from the *General Accounting Office*, P.O. Box 37050, Washington, DC 20013; (202) 512-6000; fax: (202) 512-6061; e-mail: info@www.gao.gov; WWW: <http://www.gao.gov>.

FEMA Issues Interim Rule for Los Alamos Fire Victims Compensation

In the last issue of the *Observer*, we mentioned that Congress had passed the Cerro Grande Fire Assistance Act (Public Law 106-246) that, among other things, compensates victims of the Los Alamos fire, started by employees of the National Park Service (see the *Observer*, Vol. XXV, No. 1, p. 11). On August 28, 2000, FEMA issued an interim final rule that outlines procedures applicants should follow to obtain assistance for injuries and property damage resulting from the fire.

The rule, published in the *Federal Register* (Vol. 65, No. 167, pp. 52260-52279), provides an overview of the claims process; explains the procedure for filing a claim; describes compensation available under the act; explains how claims are to be documented and evaluated; and describes appeal rights, arbitration, and judicial review procedures.

The regulations can be found in any *federal repository library* or on-line from both the *U.S. Government Printing Office*: <http://www.access.gpo.gov> or *FEMA*: <http://www.fema.gov/CerroGrande>.

FEMA IG Reviews Flood Insurance Compliance

According to FEMA's Inspector General (IG), who recently examined the National Flood Insurance Program (NFIP) to determine how many structures in floodplains actually had federally mandated flood insurance, as many as 38% are not covered. (However, the Federal Insurance Administration [FIA], the agency that oversees the NFIP, believes the noncompliance rate is closer to 60%.) The IG's review can be found in *Opportunities to Enhance Compliance with Homeowner Flood Insurance Purchase Requirements* (Report No. I-02-00, 2000, 46 pp., free).

The NFIP was enacted by Congress in 1968 to provide flood insurance to property owners in communities that agree to adopt and enforce floodplain management ordinances that reduce flood risk. To strengthen that program, the Flood Disaster Protection Act of 1973 mandated that federally regulated lenders could not make loans on floodplain properties without requiring flood insurance.

The Inspector General recommends that, in order to enhance compliance, the FIA should:

- Study compliance levels in areas recently affected by floods;
- Identify structures that were originally outside Special Flood Hazard Areas (SFHA) but whose status may have changed after a floodplain map was updated;
- Initiate a process that ensures lapsed policies are identified and facilitates followup by regulatory agencies with lending institutions; and
- Establish consistent standards to govern flood zone determination companies, which are used extensively by lenders to determine whether a property requires flood insurance.

The FIA disagrees with the findings of the IG, and their comments on the IG's conclusions can be found in the appendix. To obtain a copy of this report, call the *Office of the Inspector General, FEMA*; (202) 646-4166 or send a fax: (202) 646-4166.

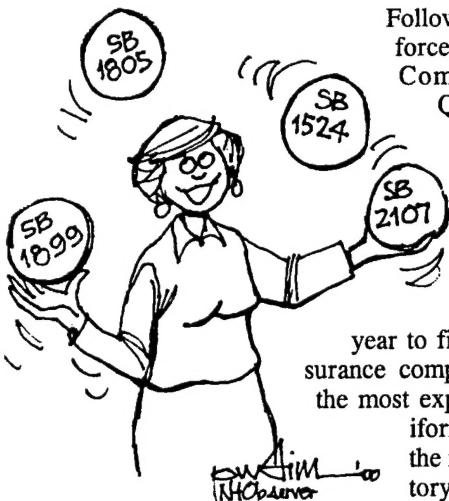
FEMA Announces Disaster Resistant Universities

FEMA wants to help colleges and universities limit future property and economic damage from natural disasters. Using the same approach as FEMA's Project Impact, the Disaster Resistant Universities initiative provides about \$100,000, to be matched by the recipient, to assess university vulnerabilities to natural hazards and to implement strategies to limit damage before disasters occur. Five campuses have been selected as initial participants: Tulane University, the University of Alaska-Fairbanks, the University of Miami, the University of Washington-Seattle, and the University of North Carolina-Wilmington.

The project began with a University of California-Berkeley study of the economic consequences of a disaster on that university and its surrounding community and state. Concluding that such a disaster would have severe economic consequences, UC-Berkeley subsequently developed a plan to limit future disaster losses and guidelines for other universities to use (see the *Observer*, Vol. XXIV, No. 1, p. 1; Vol. XXIV, No. 6, p. 11, Vol. XXV, No. 1, p. 27).

The Disaster Resistant Universities initiative will enable these new participants to identify risks and undertake preventive actions at the local level, establish public-private partnerships, and promote long-term efforts and investments in risk reduction. For more information, contact *FEMA, Mitigation Directorate, Project Impact, 500 C Street, S.W., Washington, DC. 20472*; WWW: http://www.fema.gov/nwz00/nwz00_56.htm.

Northridge Earthquake Victims Given One Year to Refile Insurance Claims



Following a scandal that forced California Insurance Commissioner Charles Quackenbush to resign under threat of impeachment, Governor Gray Davis signed a bill that allows some victims of the 1994 Northridge earthquake another year to file claims with their insurance companies. The quake was the most expensive disaster in California history and one of the most costly in U.S. history, with insured losses of over \$12 billion. The governor also signed three other bills aimed at correcting problems in the state insurance department.

The California legislature conducted bipartisan hearings in both the state senate and assembly after it was discovered that Quackenbush allowed six insurance companies to avoid billions of dollars in fines by donating \$12.5 million to a fund he created. Although the fund was set up to help quake victims and to study damage from earthquakes, none of the money was used for those purposes. Rather, about \$6 million funded public service television ads featuring the commissioner and was donated to groups with little or no

connection to earthquakes. The hearings also uncovered evidence that insurance companies paid policyholders less than they were entitled following the Northridge quake and failed to inform their customers of all the benefits to which they were entitled.

Specifically,

- Senate Bill 1899 allows policyholders who filed claims before January 1, 2000, to revive insurance claims that had expired due to the statute of limitations;
- SB 1805 requires the California Department of Insurance to make public currently confidential investigations into unfair or deceptive insurance practices;
- SB 1524 limits the use of settlement money for Department of Insurance promotional campaigns and prohibits the commissioner from appearing in any of these ads; and
- SB 2107 prevents the insurance commissioner from allowing insurers to contribute to a nonprofit entity rather than pay civil penalties and prohibits an insurance commissioner's face or name being used in promotional campaigns with insurance settlement funds.

The complete text of these bills, along with their legislative history, can be found on the California Senate Web site: <http://www.sen.gov>.

Experts Say U.S. at Grave Risk from Hurricanes

The United States is at serious risk of severe damage and loss of life due to hurricanes, according to the *Report of the Weather Channel Forum: Policy Issues in Hurricane Preparedness and Response* (2000, 35 pp., free). This report, the result of a workshop hosted by the Weather Channel and the American Meteorological Society (AMS), presents findings and recommendations that the authors believe could greatly improve the nation's ability to cope with the inevitable landfall of a major hurricane. Participants included representatives from hurricane forecast organizations, the weather media, emergency managers, political and corporate leaders, socioeconomic weather impact analysts, and academics.

Participants concluded that current hurricane preparedness and response rely primarily on weather prediction and consequent evacuation; population and economic growth in hurricane-prone areas are both increasing rapidly; evacuation times now exceed the lead-time of high confidence warnings; and many people remain in areas of risk due to overloaded roads and shelters. Overall, they concluded, hurricane pre-

paredness and response in the U.S. deserve a thorough re-examination.

Principal recommendations include:

- Congress should call for a "National Assessment of Hurricane Preparedness and Response."
- FEMA should lead an effort with its partner agencies to strengthen the current federal hurricane response system.
- Research is needed on prediction uncertainties, the behavior of those receiving hurricane warnings, evacuation and other emergency management decisions, and poor communication of hurricane risks.
- Congress should ensure funding for hurricane research, prediction, mitigation, and response.

The complete report is available on the AMS Web site: <http://www.ametsoc.org/AMS>.



THE INTERNET PAGES



Below are some recent disaster Internet resources the Hazards Center staff has encountered. For a list of some of the better sites dealing with hazards and disasters, see <http://www.colorado.edu/hazards/sites/sites.html>.

Everything Federal

<http://www.firstgov.gov>

This new Web site—touted as the entry point for *all* federal government Web-based information—is now open for business. A search on “hazards” returns 130,000 entries, rated according to relevance.

All Hazards

<http://www.fema.gov>

The Federal Emergency Management Agency (FEMA) Web site has been remodeled. With more than 30,000 pages now available from the site, a primary goal of the new design is to make it easier for visitors to quickly find the information they need. New features include immediate search engine access, mouse-over menus, and a cleaner, tighter layout. With this upgrade, a new page—<http://www.fema.gov/emanagers>—has been launched to provide emergency managers with quick access to information of professional interest. FEMA is interested in comments and suggestions about the new design, particularly comments from the emergency management community about the new “Emanagers” page. Comments can be e-mailed to eipa@fema.gov.

<http://www.agctr.lsu.edu/eden>

Following the Great Mississippi Floods of 1993, several state cooperative extension services (CESs) were inundated with requests for information on disaster response and recovery, but found themselves ill-prepared to provide it. Subsequently, the U.S. Department of Agriculture issued a grant to 12 north-central CESs to explore ways to better prepare for such events. Seven years later the result is a 30-state network of CESs—the Extension Disaster Education Network (EDEN)—that is working to develop or enhance educational resources on disasters and to educate and train CES staff. The EDEN Web site provides extensive information about the network and many of the disaster preparedness, response, recovery, and mitigation resources the network has identified or prepared. EDEN maintains a shared database of disaster-related resources available from member states and direct links to extension service on-line disaster information. The site also provides a directory of state EDEN representatives with complete contact information.

<http://www.fsa.usda.gov/pas/disaster/assistance1.htm>

The U.S. Department of Agriculture’s Farm Service Agency Natural Disaster Assistance Web page furnishes information for farmers who have sustained damage due to natural disasters such as hurricanes, tornadoes, and floods. The Emergency Conservation, Emergency Loan Assistance, Emergency Haying and Grazing Assistance, and the Noninsured Crop Disaster Assistance programs all provide aid to farmers to rehabilitate eligible farmland damaged by natural disasters. The site provides information regarding the assistance for which farmers and ranchers may be eligible, as well as details on how to apply.

http://www.epa.gov/region03/greenkit/q5_disas.htm

The Environmental Protection Agency’s Region III Green Communities Web page includes a “Green Communities Assistance Kit” designed as a comprehensive reference guide for identifying and resolving needs, interests, and problems of urban, suburban, and rural communities. Included is a “Tools for Natural Disasters” page offering a lengthy list of Internet resources divided into Policy and Planning Tools, Regulatory Tools, Technical Tools, and Financial Tools. This Web resource covers everything from hurricane preparedness training to disaster recovery programs.

<http://www.nationalatlas.gov>

In 1970, the U.S. Geological Survey published its first National Atlas and in 1997 began compiling an even more extensive digital database that is now available at no cost from the Web. The site enables a viewer to zoom in and out and download any of dozens of different informational layers. A user can choose a geographical focus and then, if interested in hazards, download information on active volcanoes, West Nile virus outbreaks, high-hazard dams, significant and historic earthquakes, or zebra mussel locations. (If, on the other hand, you’re interested in Lepidoptera, you could download information about butterfly or moth distribution . . .)

<http://www.cred.be>

The Web site for the Centre for Research on the Epidemiology of Disasters (CRED) at the Catholic University of Louvain, Belgium, has recently moved to this new URL. CRED maintains one of the more extensive databases on disasters on the Web. This site not only provides access to that database but also offers news and information about the center, including details about projects, courses, personnel, research, and more.

<http://www.iiasa.ac.at/Research/CAT/index.html>

The Natural Catastrophes and Developing Countries (CAT) Project at the International Institute for Applied Systems Analysis (IIASA) in Austria was created in 1999 as part of a research partnership with the World Bank's Disaster Management Facility (see the *Observer*, Vol. XXIII, No. 4, p. 5; and Vol. XXIV, No. 4, p. 3) and the Swiss Reinsurance Company. The project has developed a modeling technique to integrate direct estimated costs of natural disasters into macroeconomic planning models for developing countries. The modeling will provide a base to help interested parties evaluate tools for financing the cost of postdisaster reconstruction. The CAT team will develop a series of four case studies of the impacts of natural catastrophes on the economies of Argentina, Honduras, Nicaragua, and Mozambique. The long-term objective is to create a planning tool that can help developing countries evaluate options to prevent, mitigate, or transfer the costs of natural catastrophes. This CAT Web site provides descriptions of research and other activities, a list of publications and a suggested bibliography, links to related sites, and information about the research team. Additional information is available from the *Natural Catastrophes and Developing Countries Project, IIASA, Schlossplatz 1, A-2361 Laxenburg, Austria; tel: (+43) 2 236 8070; fax: (+43) 2 236 71313.*

<http://www.oas.org/en/cdmp>

The Caribbean Disaster Mitigation Project, sponsored by the U.S. Agency for International Development and undertaken by the Organization of American States, came to a close at the end of 1999. However the project's Web site remains a good source of guidelines and publications on disaster management in the region. In particular, it offers a wide array of publications on its "Papers and Publications" page: <http://www.oas.org/en/cdmp/publist.htm>.



Floods

<http://www.floods.org>

The Web site of the Association of State Floodplain Managers (ASFPM) now offers several new documents, including a *Study of the Economic Effects of Charging Actuarially Based Premium Rates for Pre-FIRM [Flood Insurance Rate Map] Structures*. The study found that if the flood insurance subsidy were eliminated among the many pre-FIRM policies, within a year the average premium would increase from \$585 to about \$2,000 per year. The study analyzes various scenarios for eliminating the subsidy. FEMA has proposed adopting a plan under which all pre-FIRM policies, other than those for principal residences, would move to actuarial rates over a seven-year period. The subsidy for principal residences would be reduced more gradually. The site also offers a summary of national flood policy changes recommended by the ASFPM, as well as news from the association.

<http://www.fema.gov/library/flolosses.htm>

In cooperation with the principal building code organizations, the Association of State Floodplain Managers, and the American Society of Civil Engineers, FEMA has created a guide for building and community officials and others involved in the planning and construction process entitled *Reducing Flood Losses Through the International Code Series: Meeting the Requirements of the National Flood Insurance Program*. The guide is intended to help communities decide how best to integrate building safety and floodplain management through code enforcement. The document, which can be downloaded from the FEMA Web site above, provides an overview of the NFIP, outlines some broad approaches to managing flood hazard areas, discusses the implications for floodplain management of adopting the new International Code Series, and points out the many responsibilities that communities assume when they participate in the NFIP—both those covered by the international codes and those that are not.

Coastal Hazards

<http://www.coastalmanagement.com>

This not-for-profit site catalogs other informative sites on coastal management and research. It outlines new research and provides links to over 1,000 coastal management Web pages world-wide including a broad range of hazard sites. It also lists coastal conferences and events. In addition, the site provides access to a free e-mail coastal management newsletter called *icoast*—intended to provide an efficient means for interested persons to keep up with recent coastal management developments on the Internet. To subscribe to *icoast* send an e-mail to *icoast_news-subscribe@egroups.com* or visit the Web site.

Earthquakes

<http://www.seismic.ca.gov>

The California Seismic Safety Commission has put three new publications on-line at the address above, free for patient downloaders of Adobe Acrobat (PDF) files.

- **SSC 00-02 — *Status of California's Unreinforced Masonry Building Law in Year 2000***
- **SSC 00-03 — *A Report to the Governor and the Legislature on Lessons Learned from Recent Earthquakes in Turkey, Greece, and Taiwan***
- **SSC 99-04/05/06 — *Earthquake Risk Management Tools for Decision Makers: A Guide, Toolkit, and Mitigation Success Stories***

<http://www.seismo.nrcan.gc.ca/staff/maurice/psychosocial.html>

Although not usually trained to manage or treat emotional stress, on occasion earth scientists must deal with people's fear of the real or perceived danger posed by earthquakes and other geological hazards as expressed in letters, phone calls, or during media interviews. For scientists faced with such situations, two Canadian geologists have prepared a short paper that outlines some basic intervention tools that can be used when addressing people with anxieties about earthquakes. The paper, "Earth Scientists Can Help People Who Fear Earthquakes," by Maurice Lamontagne and Sylvia La Rochelle, first appeared in *Seismological Research Letters* 71, No. 4, pp. 461-463. However the text is now available on the Web at the address above. Additionally, a reprint can be obtained from *Maurice Lamontagne, Geological Survey of Canada, 7 Observatory Crescent, Ottawa, Ontario, Canada K1A 0Y3; (613) 995-0600; fax: (613) 992-8836; e-mail: maurice@seismo.nrcan.gc.ca*.

Landslides

<http://landslides.usgs.gov>

http://landslides.usgs.gov/html_files/landslides/nationalmap/national.html

One of the links from the APA Landslides Project Web site (see page 5 of this *Observer*) is to the USGS Geological Hazards page on landslides, an extremely useful resource that we've described before. However, the APA project also pointed out a nifty feature that we had *not* seen before (at the second URL above)—an interactive map of landslide hazards across the United States, which can be viewed on-line or downloaded in more detail.

Meteorological Hazards

<http://www.panda.org/resources/publications/climate/xweather/download.html>

In September, the World Wide Fund for Nature (WWF) published on-line a 50-page report on *Climate Change and Extreme Weather Events*, by P. Vellinga and W.J. van Verseveld of the Institute for Environmental Studies, Vrije University of Amsterdam. The report assesses current scientific understanding of the impact of climate change on weather and meteorological extremes and addresses three main questions: To what extent can human influences on climate presently be measured? What can we expect for the short and long term? and, How will measures to reduce net greenhouse gas emissions affect future climate? The authors conclude that CO₂ and other greenhouse gas emissions are increasingly affecting temperature, precipitation, sea level rise, atmospheric circulation patterns, and ecosystems, and thus the frequency, intensity, and distribution of extreme weather events.

majordomo@ucar.edu

<http://www.esig.ucar.edu/socasp/zine/>

The Environmental and Societal Impacts Group (ESIG) at the National Center for Atmospheric Research (NCAR) has announced a new e-mail listserve and an educational resource guide for persons interested in research regarding the policy aspects of meteorology and climate hazards. The list is called "Weather-Policy"; to join, send an e-mail to *majordomo@ucar.edu* and in the body of the message type: "subscribe weather-policy <your e-mail address>" (do not include quotation marks or brackets). For additional information about the resource guide and ESIG's involvement in this area,

contact Roger A. Pielke, Jr., ESIG/NCAR, P.O. Box 3000, Boulder, CO 80307-3000; (303) 497-8111; fax: (303) 497-8125; e-mail: rogerp@ucar.edu; and/or see the opening editorial in the August 2000 edition of ESIG's on-line periodical, *Weatherzine*, at the URL above.

<http://www.bmjjournals.com/cgi/content/full/321/7262/650>

<http://www.bmjjournals.com/cgi/content/full/321/7262/670>

The September 16 issue of the *British Medical Journal* contains an editorial and paper on risks due to temperature extremes brought on by global climate change (for additional information and Web sites dealing with this issue, see the previous *Observer*, Vol. XXV, No. 1, p. 18). The editorial, "Saving Lives During Extreme Weather in Summer," by Laurence Kalkstein of the Center for Climate Research, University of Delaware, calls on health professionals worldwide to work with local health agencies and emergency management offices to develop reliable systems to warn of and deal with temperature extremes. The article, "Heat-Related Mortality in Warm and Cold Regions of Europe: Observational Study," by several European researchers, offers some interesting findings: annual cold-related mortality is higher than heat-related mortality across Europe, and, overall, Europeans can be expected to adjust to global warming predicted for the next half century. The authors point out, however, that their findings in no way negate the need to take pre-emptive measures against heat stress.



Disaster Medicine

<http://www.dismedmaster.com>

The provision of medical services in disasters requires specific knowledge, the ability to organize an emergency medical system adapted to a specific disaster situation, and the professional skill to provide medical care of high quality even in a hostile environment. To meet these goals, education and training in all aspects of disaster medicine are essential. Recognizing the need for such training, as well as for medical involvement in planning for and coordinating disaster response, a group of European universities has established a Web-based program offering a "European Master in Disaster Medicine." The program Web site provides information about course goals and program design, as well as an outline of course content and information about how courses are actually conducted. For more information, see the Web site above or contact Francesco Della Corte, Chairman of the Organizing Secretariat, Istituto di Anestesiologia e Rianimazione, Università Cattolica del S. Cuore, L.go A. Gemelli 8-00168 Rome, Italy; tel: 0630154490; fax: 063013450; e-mail: fcorte@uni.net.

Asteroids

<http://www.nearearthobjects.co.uk>

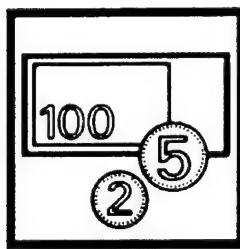
In January 2000 the U.K. Minister for Science announced the creation of a Task Force on Potentially Hazardous Near Earth Objects (NEOs—asteroids and comets whose orbits bring them close to the earth). He invited the task force to recommend how the U.K. could best contribute to international efforts to determine and mitigate the risk of collisions with NEOs. This Web site offers the final report of the task force, including 14 recommendations. The task force notes that the risk due to objects whose orbits are known can be projected with temporal and spatial accuracy, whereas the risk due to uncharted objects can only be computed using statistical averages and thus cannot include predictions of time or place of occurrence. Consequently, a principle focus of the recommendations is the establishment of facilities (i.e., telescopes) and programs to identify and chart the orbits of NEOs. They also address the British role in a greater international effort, the assessment of risks, and measures to mitigate future impacts. In addition, the report provides a comprehensive review of current knowledge about this hazard.

E-mail Lists

<http://www.Egroups.com/group/SwiftH2O-News>

<http://www.Egroups.com/group/DisasterSurvivorSupport>

Two new e-mail lists have been created. The first focuses on lifesaving in hydrological hazards; the second is a support group for disaster survivors. *SwiftH2O-News* enables swiftwater/flood rescue personnel, emergency managers, meteorologists, and others to exchange information, post operational guidelines, and discuss the discipline of technical rescue. Membership is free and open to all interested persons. The *DisasterSurvivorSupport* group is a peer support network for anyone who has endured a disaster, including families who have lost loved ones. The list is open to the public and intended to be a "survivor helping survivor" network; however, research professionals are also welcome. For more information or to subscribe to either group, see the Web pages above.



CONTRACTS AND GRANTS

Below are descriptions of recently awarded contracts and grants for the study of hazards and disasters. An inventory of contracts and grants awarded from 1995 to the present (primarily those funded by the National Science Foundation) is available on the Natural Hazards Center's Web site: <http://www.colorado.edu/hazards/grants.html>.

Reconstruction of Drought and Streamflow Over the Coterminous United States from Tree Rings, with Extensions in Mexico and Canada. Funding: National Science Foundation, \$35,674, 36 months. Principal Investigators: *Connie A. Woodhouse, University of Colorado-Boulder, 450 UCB, Boulder, CO 80309-0450; e-mail: woodhous@ngdc.noaa.gov;* and *David M. Meko, University of Arizona, Tree Ring Laboratory, West Stadium 105, Tucson, AZ 85721; (520) 621-3457; e-mail: dmeko@ltrr.arizona.edu.*

This award will support a dendrochronological (tree ring) study of past droughts in North America. The project will consider new measures of drought, improved techniques for drought management through reservoir operation and water resource allocation, and improved statistical measures for analyzing drought variability.

Coastal Tsunami Effects: Mitigation Component. Funding: National Science Foundation, \$128,000, 36 months. Principal Investigator: *Jane Preuss, GeoEngineers, Inc., 600 Stewart Street, Suite 1215, Seattle, WA 98101; e-mail: jpreuss@geoengineers.com.*

Recently, the National Oceanic and Atmospheric Administration (NOAA) launched a comprehensive program to identify potential tsunami inundation zones along the Pacific Coast of the U.S. (see <http://www.pmel.noaa.gov/tsunami/time>). The next step in reducing loss of life and property is to evaluate the runup process—flow patterns, induced forces, and the impact of debris and floating objects—in greater detail in order to improve the design of waterfront structures and decisions concerning land use. This project involves researchers from Cornell University, Southern Methodist University, the University of Washington, Urban Regional Research, Harvard University, and Japan's Public Works Research Institute.

Strategic Renewal of Large Floodplain Rivers: Integrated Analysis. Funding: National Science Foundation, \$795,000, 12 months. Principal Investigators: *Richard E. Sparks, David C. White, John B. Braden, Andrew M. Isserman,*

Daniel W. Schneider, Douglas M. Johnston, Misganaw Demissie, and Zorica Nedovic-Dubic, University of Illinois-Urbana-Champaign. For information, contact *Richard Sparks, River Research Laboratory, Forbes Biological Station, P.O. Box 590, Havana, IL 62644; (309) 543-3950.*

A challenge facing managers of rivers, floodplains, and parts of large river valleys is to develop strategies and practices that sustain ecological systems without disrupting human economic and settlement systems that have evolved in the same area. This project's team, including hydrologists, ecologists, economists, and regional scientists, will develop a series of interrelated models of an 80-mile section of the Illinois River in west-central Illinois. The models will be used to simulate, test, and communicate to stakeholders alternative restoration strategies related to the general hypothesis that river hydrology and floodplain lands can be managed in ways that restore and sustain ecosystems while not diminishing the overall economic well-being of an affected region.

Hurricane Engineering: A New Curriculum for a Planet at Risk. Funding: National Science Foundation, \$500,000, 36 months. Principal Investigators: *Marc L. Levitan, Vijay P. Singh, William M. Moe, Brian Wolshon, and Emir Jose Macari, Hurricane Center, 3513 CEBA Building, Louisiana State University, Baton Rouge, LA 70803-6405; (225) 578-4445; levitan@hurricane.lsu.edu.*

These researchers will develop curricular materials for the newly emerging field of hurricane engineering, design and implement several new courses, create a new civil engineering minor in hurricane engineering at Louisiana State University (LSU), prepare the first textbook on the subject, and establish a Web-based program. A multi-disciplinary team of 23 faculty from civil, environmental, chemical, and mechanical engineering; coastal science; landscape architecture; and environmental studies will participate in the project, coordinated by the LSU Department of Civil and Environmental Engineering and the LSU Hurricane Center, with participation from other LSU departments, Southern University, and the University of Missouri-

Rolla. The course "Hurricanes and the Built Environment" will be developed for nonengineering majors and will be a core component of a new degree in Disaster Science, Mitigation, and Management, being developed by the Hurricane Center for the College of Arts and Sciences.

Collaborative Research: Damage Assessment, Control, and Restoration of the Electric Power Grid Following Catastrophic Disturbances. Funding: National Science Foundation, \$80,000, 12 months. Principal Investigators: *Arun G. Phadke and Virgilio A. Centeno, Bradley Department of Electrical and Computer Engineering, 340 Whittemore Hall, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061-0111; e-mail: aphadke@vt.edu; and Vijay Vittal and Manimaran Govindarasu, Iowa State University, Ames, IA 50011; e-mail: vittal@ee.iastate.edu.*

Due to the complexity of power delivery networks spanning large geographical areas, power restoration can be difficult following catastrophic disturbances by natural phenomena or human action. This project will examine damage assessment, control, and restoration of electric power grids, including the use of a wide array of communication technologies such as global positioning systems, microwave networks, the Internet, low-earth orbit satellites, and other networks. It will address issues related to the scheduling and processing of real-time information in order to assess damage and any hazards caused by a failure, as well as the best approaches for restoring power.

Analysis of Institutional Response to the Taiwan Earthquake. Funding: National Science Foundation, \$74,999, 12 months. Principal Investigators: *Carla S. Prater, Dennis E. Wenger, and Michael K. Lindell, Hazards Reduction and Recovery Center, College of Architecture, C.B. 3137, Texas A&M University, College Station, TX 77843-3137; e-mail: carla@archone.tamu.edu.*

This study focuses on governmental and institutional response to the September 1998 earthquake in Taiwan that left nearly 2,500 people dead and thousands injured and homeless. It will examine the capacity of local governments to respond to the disaster and the relationships between local jurisdictions and the national government.

Doctoral Dissertation Research: Social and Political Aspects of Flooding in the Tensas Basin of Louisiana, 1865-1930. Funding: National Science Foundation, \$4,915, 24 months. Principal Investigator: *Arthur F. McEvoy, 975 Bascom Mall, University of Wisconsin, Madison, WI 53706; (608) 265-4771; e-mail: amcevoy@facstaff.edu.*

The Tensas River Basin in the northeastern part of Louisiana, was subjected to repeated flooding after the Civil War. Although scientists have a good understanding of how flooding shaped and reshaped the physical terrain of the lower Mississippi River Valley, the social and political repercussions of repeated flooding remain largely unexplored. This study's hypotheses assume that floods and flood policies divided communities; flooding upset social relations as people struggled to reorder their world; and race, class, and gender affected how people experienced the floods. Primary sources of information include government

documents, newspapers, manuscript collections, maps, photographs, and published reports. Statistics will also be gathered from census, tax, conveyance, and plantation records.

Hurricane Risk Modeling and Forecasting. Funding: National Science Foundation, \$25,000, 18 months. Principal Investigator: *Rachel A. Davidson, 373 Hollister Hall, Department of Civil and Environmental Engineering, Cornell University, Ithaca, NY 14855; (607) 255-7155; e-mail: rad24@cornell.edu.*

As cities grow, age, and evolve, their exposure and vulnerability to natural hazards changes dramatically. Risk assessors and managers, therefore, will always be a step behind the problem unless they anticipate how the world will change, estimate what the risk will be when a hazard such as a hurricane occurs in the future, and plan for that scenario. This study will develop a prototype risk assessment system that evaluates wind hazard, coastal flooding, and vulnerability to damage as a means of estimating how hurricane risk changes over time. Models will be applied to the coast of North Carolina to evaluate their effectiveness.

Real-time Capture, Management, and Reconstruction of Spatio-Temporal Events. Funding: National Science Foundation, \$649,837, 36 months. Principal Investigators: *Ouri Wolfson and Bo Xu, Department of Electrical Engineering and Computer Science, 1137 SEO, University of Illinois, Chicago, IL 60612; (312) 996-6770; e-mail: wolfson@uic.edu.*

Advances in technology have made it possible to amass and distribute unprecedented amounts of diverse data about our surroundings and activities, such as emergency response and disaster relief operations, weather conditions and storm tracks, forest fire evolution, and transportation system status. This project will evaluate an integral component of this information collection and distribution process—the transfer of data from sensor devices, where data originates, to large data banks where the information is stored and analyzed. Researchers from the University of Maryland, the University of California-Irvine, and the University of California-Los Angeles will also participate.

Understanding Individual Differences in Judgmental Performance. Funding: National Science Foundation, \$184,500, 24 months. Principal Investigators: *Thomas R. Stewart and Elise A. Weaver, Department of Public Administration and Policy, Center for Policy Research, State University of New York-Albany, Albany, NY 12201; e-mail: t.stewart@albany.edu.*

What is necessary for good judgment in uncertain situations? Some people perform better than others, both in making everyday decisions, such as a consumer determining the quality of a product, and professional judgments, such as a physician judging the severity of an illness. This study will measure how intelligence, good statistical reasoning, and the ability to learn how to use information affect judgement. It will examine weather forecasters' professional judgment performance based on their track record as forecasters and their performance on a new task. The data

will be used to explore how judgmental skill is related to other cognitive abilities.

Technological Disaster, Resource Loss, and Long-Term Social Change in a Subarctic Community. Funding: National Science Foundation, \$139,756, 12 months. Principal Investigator: *J. Steven Picou, Department of Sociology and Anthropology, Humanities Building, Room 34, University of South Alabama, Mobile, AL 36688-0002; (205) 460-6347.*

Technological disasters can have longer-term community impacts than natural disasters. This project will identify patterns of social change in a small fishing community 12 years following the Exxon Valdez oil spill. Survey and ethnographic data will be related to patterns of community stress and change, particularly the loss of ecological, social, and cultural resources.

The Collection, Synthesis, and Quality Assessment of Data Describing the Response to Human Needs Following the 1999 Turkey Earthquakes. Funding: National Science Foundation, \$74,999, 12 months. Principal Investigators: *John R. Harrald, Johan R. Van Dorp, and Joseph Barbera, Institute for Crisis and Disaster Management, Gelman Library, Suite 904, 2130 H Street, N.W., George Washington University, Washington, DC 20052; e-mail: harrald@seas.gwu.edu.*

Turkish governmental and nongovernmental organizations failed to anticipate the scale of human needs following the devastating 1999 earthquakes. Scenario-based needs estimation modeling is essential to the development of the response and recovery strategies, plans, and organization structures needed to prepare for future earthquakes. The purpose of this research is to collect the data necessary to develop models before they are lost. The resulting databases will be made available to researchers and emergency planners on the Internet.

Impact of a Natural Catastrophe on Animal Populations. Funding: National Science Foundation, \$24,258, 12 months. Principal Investigators: *George W. Uetz, Guy N. Cameron, and Michal Polak, A & S Biological Sciences, Crosley 1507, University of Cincinnati, Cincinnati, OH 45221-0006; e-mail: uetz@uc.edu.*

In April 1999, a class 5 tornado struck the area north of Cincinnati, Ohio, destroying approximately half of the 65-acre Benedict/Hazelwood Botanical Preserve. The blow-down area has been left relatively undisturbed to allow analyses of forest recovery. This study will examine the first post-tornado generation of several animal species and determine whether environmental stress from habitat destruction will lead to developmental instability.

Earthquake Damage Detection Using Remote Sensing Technologies: Validation Using Data from the 1999 Earthquakes in Turkey and Taiwan. Funding: National Science Foundation, \$75,000, 12 months. Principal Investigators: *Masanobu Shinozuka and Ronald T. Eguchi, Department of Civil and Environmental Engineering, Mail Code 2531, University of Southern California, Los Angeles, CA*

90089; (213) 740-9528; e-mail: shino@usc.edu or eguchi@aol.com.

The objective of this project is to determine the feasibility of using remote sensing to determine the scope and magnitude of damage after major earthquakes. It will combine remote sensing and ground-based loss estimation data from the Turkey and Taiwan earthquakes.

Biocomplexity-Incubation Activity: Integrated Modeling of the Complementarities and Conflicts Between Ecological Systems and Economic Activities in North Carolina. Funding: National Science Foundation, \$99,999, 24 months. Principal Investigators: *V. Kerry Smith and Leonard J. Pietrafesa, Department of Economics, Box 8110, North Carolina State University, Raleigh, NC 27695; (919) 737-7888; e-mail: kerry_smith@ncsu.edu.*

Rapid economic growth, ongoing transformation of environmental resources, growing nutrient loadings in coastal waterways, animal agriculture, and the prospect of increased hurricanes and coastal flooding are all growing concerns in North Carolina. This research will develop links between ecosystem models and an economic model to describe the interactions of ecological processes and economic activities in that region.

Development of a Database from the Dusce-Bolu Region in Turkey to Enable Testing Hypotheses Relating Urban Building Damage to Structural, Geotechnical, and Geological Parameters. Funding: National Science Foundation, \$74,999, 12 months. Principal Investigators: *Robert J. Frosch, Mete A. Sozen, Antonio Bobet, Julio A. Ramirez, and Kenneth D. Ridgway, Department of Civil Engineering, Purdue University, West Lafayette, IN 47907-1284; (765) 494-5904; e-mail: frosch@purdue.edu.*

This project will gather, collate, and archive data related to urban building seismic vulnerability in the Duzce-Bolu region in Turkey, focusing on the damage caused by the November 12, 1999, event. It will be carried out by faculty and students of Purdue University, the University of Notre Dame, the University of Illinois, and the Middle East Technical University in Ankara, Turkey. The Turkish State Waterworks and the Turkish Directorate for Resettlement and Natural Disasters will share their databases of geological, geotechnical, and seismological information. Preliminary data is already available on-line at <http://www.AnatolianQuake.org>.

Hazardous Materials Releases and Associated Emergency Response Efforts in the Turkey Earthquake of August 17, 1999: Implications for Future Risk Management Planning. Funding: National Science Foundation, \$74,801, 12 months. Principal Investigator: *Laura Steinberg, Department of Civil and Environmental Engineering, Tulane University, New Orleans, LA 70118; e-mail: lauras@mailhost.tcs.tulane.edu.*

The August 1999 quake in Turkey offers a unique opportunity to study how hazardous materials releases may be triggered by earthquakes. The investigator will survey Turkish industrial facilities to learn what hazardous materials releases occurred and what mitigation and emergency

response measures were effective. She will offer recommendations for making U.S. and Turkish hazardous material management plans and emergency response procedures more responsive to the unique circumstances caused by joint natural and technological disasters.

Spatial Based Integrated Assessment of Emergency Preparedness, Response, and Recovery for the Kocaeli (August 17, 1999) and Duzce (November 12, 1999) Earthquakes. Funding: National Science Foundation, \$74,970, 12 months. Principal Investigator: *Ted S. Vinson, 107 Apperson Hall, Department of Engineering, Oregon State University, Corvallis, OR 97331; (541) 737-3494; e-mail: vinson1@ccmail.orst.edu*.

Vinson and his colleagues will collect and organize time-sensitive data and field information, records of constructed facility performance, and reports of institutional action related to emergency response and recovery for these two quakes. The effort will be undertaken by teams of U.S. and Turkish scientists, engineers, and earthquake professionals, and is part of a larger research program to develop a spatial analytical approach to improve emergency preparedness, response, and recovery for earthquakes.

NSF Funds First Phase of Earthquake Network

The National Science Foundation (NSF) has awarded \$300,000 to the University of Illinois at Urbana-Champaign to design a national online network for sharing earthquake engineering data. The award is the first step in implementing the Network for Earthquake Engineering Simulation (NEES), which will provide earthquake engineers remote access to testing and experimental facilities (see the *Observer*, Vol. 23, No. 5, p. 2).

The network will provide researchers across the U.S. access to advanced research equipment, databases, and computer modeling and simulation tools. The university's National Center for Supercomputing Applications will lead a six-month study and design project, partnering with the university's Department of Civil Engineering, the Mid-America Earthquake Center, the Department of Energy's Argonne National Laboratory, the University of Michigan's Collaboratory for Research on Electronic Work, and the University of Southern California's Information Sciences Institute and Department of Civil Engineering. NSF expects to provide additional funds late this year to upgrade existing earthquake research facilities and build new ones.

For more information on the NEES project, view the NSF Web site: <http://www.eng.nsf.gov/nees>.

MCEER, PEER, NCREE, and ONSTHM Launch Joint Program to Study Taiwan Quake

A new cooperative research program was recently established by the Multidisciplinary Center for Earthquake Engineering Research (MCEER) and the Pacific Earthquake Engineering Research (PEER) Center in the U.S., and the National Center for Research in Earthquake Engineering (NCREE) at National Taiwan University and the Office of National Science and Technology Hazard Mitigation in Taiwan. The program will address two principal aspects of the recent Chi-Chi, Taiwan, earthquake: analysis of new information to enhance model validation and development of better understanding that will lead to a new, more accurate knowledge base, and code improvements and implementation specific to Taiwan developed by earthquake hazard mitigation professionals.

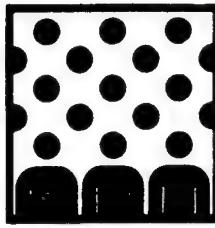


The research program will apply new reconnaissance information to projects already in progress. Proposed focus areas include:

- Ground motion attenuation, site effects, spatial variation, and validation;
- Retrofit strategies for buildings shown to be vulnerable by the Chi-Chi earthquake and development of evaluation and retrofit strategies for hospitals and selected manufacturing facilities;
- Evaluation and retrofit strategies for, and system analysis of, electric power and water systems;
- Earthquake reconnaissance data collected following the quake and development of new system-related loss estimation methods for HAZ-Taiwan, a hazard analysis program; and
- Social and economic issues.

The four centers are currently developing specific details of the research program. For more information, contact *MCEER, State University of New York at Buffalo, Red Jacket Quadrangle, Buffalo, NY 14261-0025; (716) 645-3391; fax: (716) 645-3399; e-mail: mceer@acsu.buffalo.edu; WWW: http://mceer.buffalo.edu*.

[Adapted from the Summer 2000 MCEER Bulletin]



CONFERENCES and TRAINING

Below are the most recent conference announcements received by the Natural Hazards Center. A comprehensive list of hazard/disaster meetings is posted on our World Wide Web site: <http://www.colorado.edu/hazards/conf.html>.

Tenth Plenary Meeting of the Working Group on Emergency Telecommunications (WGET). Convener: United Nations Office for the Coordination of Humanitarian Affairs (OCHA). New York, New York: November 30-December 1, 2000. This conference will include all United Nations agencies involved in international humanitarian assistance as well as major nongovernmental organizations and individual experts from the private sector and academia concerned about the use of telecommunications in emergencies and disasters. For details see <http://www.reliefweb.int/telecoms>, or contact Goli Farrell, WGET Secretariat, e-mail: farrellg@un.org; fax: +41 22 917 0208.

Emergency Preparedness for the Americas Conference. Sponsor: U.S. Trade and Development Agency (TDA) in co-operation with the Federal Emergency Management Agency (FEMA). San Juan, Puerto Rico: December 4-6, 2000. Recognizing that the disaster management focus in Latin America and the Caribbean is changing from response, recovery, and reconstruction to preparedness and mitigation, TDA and FEMA have organized this conference so that agencies involved in hazard mitigation projects in the region can learn about the goods and services available from U.S. companies that can help them accomplish their goals. A conference brochure and further details are available from Sylvia Szankay, Technical Resources International, Inc., 6500 Rock Spring Drive, Suite 650, Bethesda, MD 20817; (301) 897-7482; fax: (301) 897-7400; e-mail: sszankay@tech-res.com; WWW: <http://www.tech-res-intl.com/tda/emergency>.

Responding to Disaster. Host: Mansfield College, Oxford University. Oxford, U.K.: December 10-11, 2000. This interdisciplinary conference will explore issues surrounding all types of disasters, including management, training, and response. Perspectives will include anthropology, agricultural economics, city planning, community health services, cultural studies, economics, environmental sciences, geography, government, literature, philosophy, political studies, psychology, sociology, and theology. Participants

will also include representatives of aid agencies, charities, consulting firms, government departments, nongovernmental organizations, emergency services, and the armed forces. For further details and information, contact Rob Fisher; fax: 0870 0560055; e-mail: rob@fishwest.demon.co.uk.

International Conference on Natural Disasters. Sponsors: Governments of Japan and Hyogo Prefecture, United Nations International Strategy for Disaster Reduction (ISDR) Secretariat, World Bank, and others. Kobe, Japan: February 5-7, 2001. The major goal of this conference is to identify ways to improve international cooperation in disaster management, particularly in areas other than disaster relief, such as preparedness, risk reduction, and reconstruction. The organizers will promote an integrated approach recognizing that all aspects of disaster reduction are related. The meeting will draw on lessons learned from recent disasters, and participants will be invited to adopt a statement on disaster preparedness, reconstruction, and mitigation. Additional information is available from Toshiyasu Noda, Disaster Prevention Bureau, National Land Agency, Japan; tel: +81 3 3503 5691; fax: +81 3 3501 5199; e-mail: a711901@nla.go.jp.

Hemispheric Conference on Vulnerability Reduction of Trade Corridors to Natural Disasters. Organized by the Organization of American States, Unit for Sustainable Development and Environment; and the Secretariat of Environment, Government of the Province of Mendoza, Argentina. Mendoza, Argentina: March 26-28, 2001. This conference will bring together public- and private-sector specialists in agriculture, energy, and transportation development; risk and natural hazards management; and international development and finance to discuss the disaster vulnerability of international trade, focusing on the four major geographical trade areas of the hemisphere—the North American Free Trade Association (NAFTA), Mercosur (the Southern Common Market), the Andean Community, and the Central America Common Market. Presentations will be used to formulate action agendas to reduce natural

disaster impacts on trade and to ensure that natural hazard risks are incorporated into business and trade planning. The conference will be in English and Spanish with simultaneous translation. For further information, contact *Karina Nowakowski, tel: 0054-261-4232841 or 0054-261-439-4531; fax: 0054-261-452-5378; e-mail: karinnowakow@mixmail.com, or riesgo_gest@hotmail.com*. Alternatively, interested persons can contact the *Organization of American States, Unit for Sustainable Development and Environment, 1889 F Street, N.W., Washington, DC 20006; (202) 458-6295; fax: (202) 458-3560.*

International Disaster Management Conference. Sponsor: *Florida Emergency Medicine Foundation, Tampa, Florida: March 28-April 1, 2001.* The International Disaster Management Conference will review recent disasters, highlighting incident command strategies and issues in interagency coordination. For details, contact *Suzanne Lobb, Conference Coordinator, Florida Emergency Medicine Foundation, 3717 South Conway Road, Orlando, FL 32812; (800) 766-6335 or (407) 281-7396; fax: (407) 281-4407; e-mail: info@fcep.org; WWW: http://www.fcep.org.*

Twelfth Global Warming International Conference and Expo (GWXII): Year 2001 Conference. Hosts: *Global Warming International Program Committee and Global Warming International Center, Cambridge, U.K.: April 8-11, 2001.* This conference includes tracks covering climate change and global warming, global climate surveillance, extreme events, El Niño & La Niña, impacts on wildfires and forestry, Kyoto Accord compliance and the future of energy and natural resource management, human health, education, oceans and global warming, strategies for mitigating effects



of greenhouse gas emissions, policy and economics related to Kyoto compliance, international law and policy making, state and local government actions, and sustainable environment and health in the face of global climate change. The conference also includes the GWXII Expo to promote networking among participants. For complete information, contact the *Global Warming International Center, 22W381 75th Street, Naperville IL 60565; (630) 910-1551; fax: (630) 910-1561; e-mail: gw12@globalwarming.net; WWW: http://www.globalwarming.net.*

Sixth World Congress on Stress, Trauma, and Coping. Sponsor: *International Critical Incident Stress Foundation (ICISF), Baltimore, Maryland: April 18-22, 2001.* ICISF is a nonprofit foundation dedicated to the prevention and mitigation of disabling stress through the provision of education, training, and other services for emergency personnel; continuing education and training in emergency mental health for all mental health professionals; and

consultation in the establishment of crisis and disaster response programs. The world congress provides an opportunity for both emergency management and mental health professionals to survey the state of practice in this field. To receive e-mail updates and a call for papers, contact *Shelley Cohen, World Congress Coordinator, ICISF, 10176 Baltimore National Pike, Unit 201, Ellicott City, MD 21042; (410) 750-9600; fax: (410) 750-9601; e-mail: scohen@icisf.org; WWW: http://www.icisf.org.*

2001 National Disaster Medical System (NDMS) Conference. *Dallas, Texas: April 21-25, 2001.* The 2001 NDMS conference is designed to promote interaction among local, state, and federal policy makers and health practitioners of all kinds. It will include over 75 accredited educational sessions focusing on areas such as planning, public health, emergency medicine, counterterrorism, new tools and approaches, and communications. More information is available from *NDMS, 12300 Twinbrook Parkway, Suite 360, Rockville, MD 20857; (301) 443-1167 or (800) 872-6367; fax: (301) 443-5146 or (800) 872-5945; e-mail: ndms@usa.net; WWW: http://www.oep-ndms.dhhs.gov.*

Americas Conference on Wind Engineering (formerly U.S. National Conference on Wind Engineering). Sponsors: *American Association for Wind Engineering and others. Clemson, South Carolina: June 3-6, 2001.* Principal conference topics are "Decision Making and Policy," "Performance of Low-Rise Buildings," and "State-of-the-Art Issues in Research and Practice." For details, contact *Scott D. Schiff, Department of Civil Engineering, Lowry Hall-Box 340911, Clemson University, Clemson, SC 29634-0911; (864) 656-0456; fax: (864) 656-2670; e-mail: scott.schiff@ces.clemson.edu.*

Public Risk Management Association (PRIMA) 2001 Annual Conference. *Chicago, Illinois: June 10-13, 2001.* PRIMA's aim is to help public entities minimize their exposure to risks (including natural hazards). Five student scholarships to the PRIMA conference are available; applications are due February 16, 2001. For complete information, contact *PRIMA, 1815 North Fort Myer Drive, Suite 1020, Arlington, VA 22209-1805; (703) 528-7701; fax: (703) 528-7966; e-mail: info@primacentral.org; WWW: http://www.primacentral.org.*

Tenth Congress of the Federation of International Studies on Latin America and the Caribbean. *Moscow, Russia: June 26-29, 2001.* The congress will include a section on "Natural Disaster Vulnerability of Latin American Urban Settlements," with sessions on "Vulnerability and Poverty"; "Past Experiences: Earthquakes, Volcanic Eruptions, Hurricanes and Natural Catastrophes from a Historical Perspective"; "Pre-Columbian and Colonial Settlements in the Face of Natural Catastrophes"; and, "Liberalism, Market and Environmental Degradation Related to Increased Vulnerability." For information on the program and a call for papers, contact *INCIHUSA-CRICYT, CC 131 (5500), Mendoza, Argentina; fax: (0261) 4287370; e-mail: jeferna@lab.cricyt.edu.ar or gascon@lab.cricyt.edu.ar; WWW: http://www.cricyt.edu.ar/congresos/fuealc.htm.*

International Conference on Disaster Management. Host: International Association of Disaster Management. Orlando, Florida: August 6-10, 2001. The primary goal of the International Conference on Disaster Management is to improve preparedness, response, recovery, and mitigation for all natural and human-caused disasters in order to save lives and reduce property damage. To accomplish this goal, the conference will bring together all disciplines involved in disaster management and encourage the exchange of knowledge, problems, and solutions. The program will emphasize response and recovery lessons from recent disasters around the world, current state-of-the-art programs and strategies, and new approaches currently being tested or considered. For more information, contact the *Conference Organizing Committee, International Conference on Disaster Management, 2952 Wellington Circle, Tallahassee, FL 32308; (850) 906-0221; fax: (850) 906-9228; e-mail: mail@disaster-meeting.com.*

First Joint Scientific Assembly of the International Association of Geomagnetism and Aeronomy (IAGA) and the International Association of Seismology and Physics of the Earth's Interior (IASPEI). Hanoi, Vietnam: August 20-31, 2001. This assembly will allow scientists from different disciplines to exchange ideas about present-day problems in seismology, physics of the earth's interior, geological hazards, geomagnetism, aeronomy, and other areas of interest. The program will feature a multidisciplinary array of oral and poster presentations, colloquia, general symposia, short courses, workshops, and field trips. It also includes several special symposia focusing on frontiers of international research, including the origin and evolution of natural hazards. Additional programs will be offered before and after the assembly in other regions of Vietnam. All papers must be presented in English. There will be simultaneous translation for a few symposia, and translators (English, French, Chinese, Vietnamese, and a few other languages) will also be available at the poster sessions. The abstract and grant application deadline is February 1, 2001. Details about the program, abstract submission, and registration can be found on the World Wide Web at <http://www.iagaandiaspei.org.vn>. Interested persons can also contact the *Local Organizing Committee, IAGA-IASPEI 2001, Joint Scientific Assembly, Institute of Geophysics, Box 411 Buu Dien Bo Ho, Hanoi, Vietnam; fax: (84 4)8364696; tel: (84 4) 7562802; e-mail: IAGA-IASPEI@fpt.vn.*

Institute for Business and Home Safety (IBHS) Annual Congress. San Antonio, Texas: November 14-15, 2001. IBHS is an insurance industry initiative created to reduce deaths, injuries, property damage, economic loss, and human suffering caused by natural disasters. The institute promotes planning and construction of the built environment that incorporates structural and nonstructural loss-reduction practices. The IBHS Annual Congress is a showcase for recent developments in all facets of disaster mitigation. The 2001 congress will focus on issues of interest to underwriters, actuaries, and loss-control experts. For details, contact *IBHS, 1408 North Westshore Boulevard, Suite 208, Tampa FL 33607; (813) 286-3400; fax: (813) 286-9960; e-mail: info@ibhs.org; WWW: http://www.ibhs.org.*

FEMA/MMC Offer Mitigation Planning Fellowships

As the direct losses and disruptions caused by natural disasters continue to grow, communities have become increasingly aware that natural hazards were often inadequately considered in previous development decisions and that there is more to disaster recovery than reconstructing buildings and infrastructure. Community leaders are also finding that they lack strategies for dealing with the complex, politically and emotionally charged environment after a disaster occurs. Moreover, a 1993 study conducted by the Natural Hazards Research and Applications Information Center revealed that only a very small percentage of graduate planning programs incorporate hazard mitigation into their curricula.

To address these problems, the Federal Emergency Management Agency (FEMA), through the Multihazard Mitigation Council (MMC) of the National Institute of Building Sciences (NIBS), sponsors Hazard Mitigation Planning Fellowships for graduate-level planning students. The fellowships are intended to foster integration of hazard mitigation principles into graduate-level curricula of planning schools; encourage the use of planning policies, tools, and techniques to reduce the impacts of natural hazards in the U.S.; help determine how FEMA can best assist communities, regional organizations, and states in developing and maintaining effective hazard mitigation planning programs and how FEMA can best integrate planning principles and approaches into its mitigation and recovery programs.

The graduate student or students selected will be provided funding for one year of field research in local and state hazard mitigation planning. The fellowships will involve orientation work at FEMA headquarters in Washington, D.C.; extensive fieldwork within communities to be selected by FEMA; and independent follow-up work during the 2001-2002 academic year.

All applicants must have completed one year of graduate study before the summer of 2001, be a U.S. citizen or permanent resident, demonstrate an understanding of and interest in planning and disasters, have the support of a faculty advisor who shares that interest, and be willing to prepare a paper and presentation on their research.

Interested persons must submit an application and supporting materials by January 8, 2001. For an application form and additional information, contact *Claret M. Heider, National Institute of Building Sciences, Multihazard Mitigation Council, 1090 Vermont Avenue, N.W., Suite 700, Washington, DC 20005-4905; (202) 289-7800, ext. 134; fax: (202) 289-1092; e-mail: cheider@nibs.org.*

New Programs and Projects in Latin America and the Caribbean

Much of the information below is taken from the Regional Disaster Information Center for Latin America and the Caribbean (CRID) Web site—<http://www.crid.or.cr>—and from *ISDR Informs*—the newsletter of the United Nations International Strategy for Natural Disaster Reduction Office for Latin America and the Caribbean, which is also available from the CRID Web site.

The Regional Disaster Information System for Latin America and the Caribbean

In February 1997, the United Nations International Decade for Natural Disaster Reduction (IDNDR) hosted a meeting in San José, Costa Rica, to discuss a common strategy for managing and disseminating disaster information in the region. The participants, representatives of many of the key national and international organizations working in Latin America and the Caribbean, agreed to create a "Regional Disaster Information System"—a network of institutions and information centers coordinated by the Regional Disaster Information Center for Latin America and the Caribbean (CRID). The network's objective is to "reduce risks and disasters in Latin America and the Caribbean through the provision of information to decision-makers, by means of inter-institutional co-operation [and] a rational use of resources." One principal goal is to establish a reference information/documentation center in every country of the region that will not only provide disaster information for that nation, but also promote a disaster information network *within* the country.

Subsequently, CRID has undertaken several activities to build national and local capacity, beginning with an organizational meeting of the Regional Disaster Information System (SRID) in August 1999 in San José. In the last year, CRID has conducted training workshops on disaster information unit management and has supported the creation of national networks in several countries of Central and South America. The agency continues these efforts and is also working to establish standard terminology and techniques for maintaining and exchanging information.

For more information about the Regional Disaster Information System for Latin America and the Caribbean, contact *Lilliana Gonzalez, CRID, Apartado 3745-1000, San José, Costa Rica; tel: (506) 296-3952; fax: (506) 231-5973; e-mail: crid@crid.or.cr; WWW: <http://www.crid.or.cr> or <http://www.crid.desastres.net>.*

The Central American Community Network for Risk Management

In risk management, as in other programs, many policies that seek to promote community development are designed at the desks of well-intentioned but not always well-informed people away from the actual community. All too often, these policies do not take hold, since they did not spring from the communities themselves.

To address this problem, the Central American Community Network for Risk Management was established in 1999 to improve the quality of life and promote sustainable

development and self-management within communities of the region by encouraging local involvement and action. The network now comprises at least 8,000 communities throughout Central America.

One of the chief goals of the network is to show institutions currently working in disaster prevention that only by working together at the local level will it be possible to reduce the hazards faced throughout Central America. To support the network, the German GTZ agency has financed the "CARECOR" project (the Spanish acronym stands for "Training the Central American Community Network for Risk Management"). One of the key components of which is, not surprisingly, training—but training intended to fundamentally change participants' world views and enable them to take charge of their own risk mitigation and thus promote community resilience.

The network does not have an overarching administrative structure with its own funds and headquarters. Each member community is expected to work independently. There being no central office, interested persons must contact individual country offices. A list with contact information is provided in the *ISDR Informs* newsletter mentioned above; see <http://www.crid.or.cr>.

The UNESCO Capacity Building for Natural Disaster Reduction Program

To promote knowledge about local risks, the application of this knowledge to local planning for housing and infrastructure, and the effective implementation of preventive and mitigation measures, UNESCO (the United Nations Educational, Scientific, and Cultural Organization) has initiated the Capacity Building for Natural Disaster Reduction (CBNDR) program, with financial support from the Netherlands government. The aim is to foster the transfer of state-of-the-art knowledge with respect to natural hazard and risk zonation to relevant organizations and institutions in developing countries.

In pursuing these aims, the CBNDR project will support regional programs that:

- Integrate existing local knowledge on the occurrence of geohazards and the available techniques for geo-information handling and spatial modeling in order to aid the production of natural hazard, vulnerability, and risk information at various scales;
- Develop, together with the user community, appropriate techniques and decision support systems to ensure the proper contribution of geohazard information to the development planning process.

Central America (CA) has been selected as the site for the first regional action program (RAP) within the CBNDR

project. The intergovernmental Centro de Coordinación para la Prevención de los Desastres Naturales en América Central (CEPREDENAC) is the coordinating agency for the region. This RAP-CA project began in April 2000 in the Netherlands with an intensive 10-week introductory course for 20 to 25 participants. Over the next three years, the project will host four one-week meetings during which participants working on the same topics (landslides, floods, etc.) will, in company with an international expert, meet to present achievements and discuss common problems. To round off the program, in 2003 CEPREDENAC will organize a large Central American specialists meeting, wherein the RAP-CA accomplishments will be presented to all institutions in the region working in disaster prevention. A handbook, a self-training package, and case history documentation will also be made available at that meeting.

The program secretariat plans to develop and secure funding for similar action programs in other parts of the developing world. Further information about the UNESCO CBNDR program is available from the *CBNDR Program Secretariat, c/o ITC, P.O. Box 6, 7500 AA Enschede, The Netherlands; tel: +31-(0)53-4874 213/221; fax: +31-(0)53-4874 200; e-mail: cbnrd.unesco@itc.nl*.

The IACNDR

The Inter-American Committee for Natural Disaster Reduction (IACNDR) is a forum for the analysis of policies and strategies promoting natural disaster reduction in the context of sustainable development. The Organization of American States (OAS) General Assembly established the IACNDR, recognizing the need to strengthen the role of the OAS in natural disaster reduction and emergency preparedness among member states.

The IACNDR is chaired by the Secretary General of the OAS and comprises other representatives from that organization, as well as leaders from the Inter-American Development Bank (IDB), Pan American Health Organization (PAHO), Pan-American Institute of Geography and History, Inter-American Institute for Cooperation on Agriculture, and Inter-American Council for Integral Development.

The purpose of the committee is to propose national policies and strategies involving sustainable development mechanisms that can reduce a country's disaster vulnerability and that can lead to emergency preparedness and response activities that enhance the effectiveness and timeliness of international and national assistance.

The IACNDR has established three working groups: Vulnerability Assessment and Indexing, headed by the OAS; Financing and Natural Disaster Reduction, headed by the IDB; and Emergency Preparedness and Response, headed by PAHO. Specific aims of the IACNDR include promoting the commitment of member states to natural disaster reduction, recommending resource priorities to the OAS and Inter-American System, evaluating and supporting recommendations regarding investment for vulnerability reduction, reinforcing links between disaster reduction and sustainable development, and identifying options in vulnerability assessment and indexing techniques.

For more information about the IACNDR contact Luis Jorge Pérez Calderón, *Emergency Preparedness and Disas-*

ter Relief Coordination Program, PAHO, 525 23rd Street, N.W., Washington D.C. 20037; e-mail: perezlui@paho.org.

The Research Center for Disaster Management

In April, Guatemala's Del Valle University and the United Nations signed an agreement to create a Research Center for Disaster Management, part of a United Nations Disaster Management Team effort to improve emergency response in Guatemala and Central America. The agreement establishes a program to promote research, professional training, and the provision of other disaster management services to communities at risk, linking scientists, international agencies, and public and private decision makers.

The center's activities will include developing plans and projects aimed at reducing social, environmental, and institutional vulnerability; strengthening the Guatemalan peace process; and promoting sustainable development. The center will study the country's natural, social, and technological hazards—their occurrence, location, magnitude, and impact—and ways to reduce vulnerability and risk.

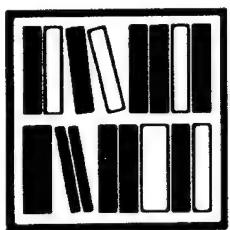
At the undergraduate level, the center will train technicians who can institute prevention measures and respond to emergencies. At the graduate and postgraduate levels, the center will train professionals who can incorporate risk analysis into planning and programs of all types, and who can develop projects that reduce social, environmental, and institutional vulnerability. The center will also provide consultant services to support the development of response plans and vulnerability reduction programs.

The team putting together the Research Center for Disaster Management is interested in any information or proposals that might aid the development of the curriculum, research agenda, training programs, and risk reduction services. For more information, or to offer suggestions, contact *Hugo Romeo Masaya, Secretario General, Universidad del Valle de Guatemala, 18 avenida 11-95 zona 15, Vista Hermosa III, Ciudad de Guatemala, Guatemala; tel: (502) 364-0336, ext. 40; fax: (502) 364-0212; WWW: http://www.uvg.edu.gt; e-mail: masayama@uvg.edu.gt*.

The U.S./Honduras Floodplain Management Mentoring Program

The Association of State Floodplain Managers (ASFPM) recently announced a program to mentor colleagues in Honduras who are working to lessen flood risks. The program will establish working relationships to support post-Hurricane Mitch flood-hazard mitigation involving the creation of an alert and warning system in strategic areas. Funded by a U.S. Agency for International Development Mission Grant through the Pan American Development Foundation (PADF), the project centers on the Aguan River Valley of northern Honduras.

For information about this project, contact *Vince Parisi, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; e-mail: vincent.parisi@fema.gov; or Diane Watson, ASFPM, 2809 Fish Hatchery Road, Suite 204, Madison, WI 53713; (608) 274-0123; fax: (608) 274 0696; e-mail: diane@floods.org*.



RECENT PUBLICATIONS

Below are summaries of some of the recent, more useful publications on hazards and disasters received by the Natural Hazards Center. A complete bibliography of publications received from 1995 through 2000 is posted on our World Wide Web site: <http://www.colorado.edu/hazards/bib/bib.html>.

All Hazards

Prediction: Science, Decision Making, and the Future of Nature. Daniel Sarewitz, Roger A. Pielke, Jr., and Radford Byerly, Jr., Editors. 2000. 400 pp. \$60.00, clothbound; \$29.50, paperback. Copies can be purchased from Island Press, Box 7, Department 2NET, Covelo, CA 95428; (800) 828-1302; fax: (707) 983-6414; WWW: <http://www.islandpress.org>.

The idea that predictive science can simplify future decision making by creating a clearer picture of the future is appealing in principle, but deeply problematic in practice. The value of predictions in public policy is not simply a technical question; it is much more than a problem of reducing uncertainties, of getting the numbers "right." Rather, prediction involves a complex mixture of interdependent scientific, political, and social factors. Technically reliable predictions in and of themselves do not translate into successful decisions. In *Prediction*, the authors examine the application of scientific predictions to problems of the environment. They discuss why prediction and science are not the same thing and why we must better understand human nature to improve our decisions about our environment. Contributors present 10 case studies in natural hazards that are perceived by decision makers as unavoidable (weather, floods, asteroids, and earthquakes); environmental problems with strong political importance (beach erosion, mining impacts, and nuclear waste disposal); and complex, difficult-to-solve environmental issues (oil and gas reserves, acid rain, and global climate change).

Topics: Annual Review of Natural Catastrophes 1999. 2000. 46 pp. Free. To request a copy, contact Angelika Wirtz, Geoscience Research Group, Munich Reinsurance Company, Königstrasse 107, 80802 Munich, Germany; tel: 4989 3891-3453; e-mail: awirtz@munichre.com. Information contained in the report is also available from the company's Web site: <http://www.munichre.com>.

The Munich Reinsurance (MunichRe) Geoscience Research Group, which has been gathering detailed world disaster data for over 25 years, has issued its annual tally of disaster losses, and the final year of the 20th century was no different than the first 99. Earthquakes in August and November in Turkey, another quake in Taiwan in September, a cyclone in the Bay of Bengal, and a debris avalanche in Venezuela claimed between 70,000 and 100,000 lives, the highest death rate since 1991, when a cyclone in Bangladesh killed 140,000. Insured losses came to \$22 billion, the second highest in the 1990s. In addition to numerous photos of disasters, *Topics* includes detailed data on the number of loss events, economic losses, number of deaths, and insured losses. It describes the various catastrophic events of 1999, statistical trends relating to natural catastrophes from 1950 to 1999, statistical comparisons among decades for that period, the culmination of the International Decade for Natural Disaster Reduction, the Climate Summit held in Bonn, the results of a MunichRe investigation into the effects of natural catastrophes—both

human and monetary losses—in countries of varying stages of development, losses due to severe storms, and alternative risk transfer and insurance securitization.

The Practice of Local Government Planning. Third Edition. Charles J. Hoch, Linda C. Dalton, and Frank S. So, Editors. 2000. 512 pp. \$42.95. Copies can be ordered from the International City/County Management Association (ICMA), (800) 745-8780 or WWW: <http://bookstore.icma.org.org>.

Sound local land-use practices are essential if local jurisdictions are to reduce the impacts of natural disasters. This new edition of *The Practice of Local Government Planning* offers practical guidance on a broad range of issues planners are likely to encounter, whether they work in inner cities, older suburbs, rural districts, or small towns. In addition to covering the latest planning trends and the impacts of technology, diversity, and increased citizen participation, this text covers basic planning elements such as housing, transportation, community development, and urban design. It includes tips for understanding recent social, environmental, and political trends and how they affect planning practice; analyzing a community's population and economic structure; identifying the potential environmental impacts of proposed development; and communicating effectively with citizens, community groups, and local government officials.

Handbook of Disaster Medicine. J. de Boer and M. Dubouloz, Editors. 2000. 520 pp. \$103.00. To purchase a copy from the U.S. or Canada, send a fax to Books International, Inc.; (703) 661-1501. To view the publisher's (Van der Wees Uitgeverij) information on-line and to download an order form, see <http://www.vsppub.com/books/medic/bkHanDisMed.html>.

The International Society of Disaster Medicine (ISDM) was created recently to cross the traditional boundaries of medicine and nationalism. As part of that effort, ISDM created an international curriculum on education and training in disaster medicine, now available in this handbook. Topics include: medical care in mass casualty events, public health, disaster management, and education and training, including international guidelines.

Response to Disaster: Psychosocial, Community, and Ecological Approaches. Richard Gist and Bernard Lubin, Editors. 1999. 232 pp. \$69.96, clothbound; \$29.95, paperback. To order a copy, contact Brunner-Routledge, Taylor & Francis Group, 7625 Empire Drive, Florence, KY 41042; (800) 634-7064; fax: (800) 248-4724; e-mail: bkorders@taylorandfrancis.com; WWW: <http://www.brunner-routledge.com>.

Psychological service in the wake of cataclysmic life events has emerged as a prominent and important component of social response to disasters. Indeed, where once help was scarce, it is now sufficiently plentiful to engender its own set of conflicts and contradictions along with

its intended solace and aid. *Response to Disaster* reconciles various technical, theoretical, and applied approaches in order to improve response. "Part 1: Theoretical Foundations" establishes a basis for the exploration and assessment of models and interventions. "Part 2: Community Strategies for Intervention" explores the application of principles developed in Part 1 through case studies, the examination of model programs, and a discussion of empirical evaluation data. The final section, "Contemporary Issues in Community Systems Research and Practice," examines current topics in both theoretical and evaluation research, ethical issues peculiar to community practice, and the legal and liability implications of community intervention.

Meeting the Needs of Vulnerable People in Times of Disaster: A Guide for Emergency Managers. 2000. 61 pp. Free. Single copies can be requested from Carrie Barneicut, California Governor's Office of Emergency Services, Coastal Region, 1300 Clay Street, Suite 400, Oakland, CA 94612; (510) 286-0895; e-mail: carrie_barneicut@oes.ca.gov. Electronic versions are also available from the e-mail address above or from <ftp://anonymous/ftp.oes.ca.gov>.

This guide provides advice for emergency management professionals and volunteer organizations on how to improve their support of people with special needs during disasters. Addressing the great diversity of special health and medical concerns, language and cultural barriers, and other life circumstances can present many challenges. *Meeting the Needs of Vulnerable People* offers tips on tapping into the resources provided by community based organizations (CBOs) and other local organizations that provide services to specific groups of people, such as the homeless, the developmentally disabled, low-income elderly, or non-English speaking populations. It describes methods for understanding various responders' roles in emergency management, establishing partnerships among organizations, bridging organizational differences, and facilitating CBOs' roles in recovery. It also provides guidance on administrative procedures, such as establishing agreements and contracts and managing reimbursements.

Office of U.S. Foreign Disaster Assistance Annual Report: FY 1999. For availability, contact the U.S. Agency for International Development, Ronald Reagan Building, 1300 Pennsylvania Avenue, N.W., BHR/OFDA 8.06.01M, Washington, DC 20523-8602; (202) 712-0400; fax: (202) 216-3706; WWW: <http://www.usaid.gov/ofda>.

The U.S. Office of Foreign Disaster Assistance (OFDA) is the office within the U.S. Agency for International Development responsible for providing non-food, humanitarian aid in response to international crises and disasters. This annual report describes the U.S. response to numerous disasters in 1999, including the devastating earthquakes in Turkey, the widespread destruction in Central America caused by Hurricane Mitch, and the civil strife in Kosovo. The increasing number of complex emergencies due to conflict have consumed the bulk of humanitarian aid over the past decade, although vulnerability to natural disasters is greater than ever due to population growth and environmental degradation. This report outlines the agency's new programming and response capabilities; its role as a donor in emergency relief; its role as coordinator of emergency relief; and its prevention, preparedness, and mitigation activities.

The Science Times Book of Natural Disasters: The Best Science Reporting from the Acclaimed Weekly Section of the New York Times. Nicholas Wade, Editor. 2000. 200 pp. \$25.00. To order a copy, contact Adventurous Travel Bookstore, 245 South Champlain, Burlington, VT 05401; (800) 282-3963; fax: (800) 677-1821; e-mail: books@atbook.com; WWW: <http://www.lyonspress.com>.

Earthquakes, tornadoes, and volcanoes have always been awe-inspiring, but scientists have discovered even more remarkable features in their efforts to better understand these phenomena. Articles in this collection describe the complex set of weather conditions that lead to tornadoes and microbursts, as well as the genesis and evolution of tsunamis as they spread from their geologic epicenter and wash over entire islands. Volcanoes are depicted as major earth events, not only devastating surrounding areas with hot ash, lava, and mudslides, but also causing changes in global weather patterns that lead to floods in some parts of the world and drought in others. Articles also examine avalanches, hurricanes, floods, storms, forest fires, sinkholes, viral pandemics, and other natural hazards.

Mental Health Services in Disasters: Instructors Guide. Raquel Cohen. 2000. Free.

Mental Health Services in Disasters: Manual for Humanitarian Workers. Raquel Cohen. 2000. Free.

A limited number of copies are available. To request one, contact the Editor, *Disasters: Preparedness and Mitigation in the Americas*, Pan American Health Organization (PAHO), Emergency Preparedness and Disaster Relief Coordination Program, 525 23rd Street, N.W., Washington, DC 20037; (202) 974-3520; fax: (202) 775-4578; e-mail: publications@paho.org; WWW: <http://www.paho.org/english/ped/pedhome.htm>.

PAHO and the World Health Organization recently announced the English version of these guides that were originally written in Spanish. They complement each other and are designed to offer guidance on reducing the social and psychological consequences of disasters.

Disaster Survival Planning: A Practical Guide for Businesses. Revised Edition. Judy Kay Bell. 2000. 174 pp. \$19.95. To order, contact *Disaster Survival Planning, Inc.*, 669 Pacific Cove Drive, Port Hueneme, CA 93041; (800) 601-4899; fax: (805) 984-2601; e-mail: staff@disaster-survival.com; WWW: <http://www.disaster-survival.com>.

This revised edition of *Disaster Survival Planning*, originally published in 1991, offers new and updated information on the use of computer systems and terminology, the need for organizations to undertake business continuity planning, industry regulations, changes in the insurance industry and the role of the Federal Emergency Management Agency, and major disasters since 1991. Bell discusses the need for creating a business continuity plan, gaining executive approval, resolving policy issues, designating officer succession, providing guidelines for top managers, restoring business operations, considering physical aspects, establishing an emergency operations center, assessing damage and prioritizing resources, testing the plan, and taking care of employees.

Living Dangerously: Navigating the Risks of Everyday Life. John F. Ross. 2000. 208 pp. \$14.00. Copies may be obtained from Perseus Books Group, Customer Service, 5500 Central Avenue, Boulder, CO 80301; (800) 386-5656; fax: (303) 449-3356; e-mail: westview.orders@perseusbooks.com; WWW: <http://www.perseusbooksgroup.com>.

From cholesterol to cancer, asteroids to earthquakes, we face more risks than our grandparents ever dreamed of. But most of us are 200 years behind the curve when it comes to making intelligent risk-based decisions. We refuse to fly, but do not wear seat belts in our far more dangerous cars. We panic about toxic waste dumps, but collectively smoke a billion cigarettes a year. In *Living Dangerously*, John Ross argues that the burgeoning science of risk assessment has given us powerful new tools to cope with a complex world, if we could only learn to speak the language. Ross examines the building blocks of this new language and how long-held, often pre-set, biological and psychological responses to risk affect human perception.

Hurricanes

Two Months of Flooding in Eastern North Carolina, September-October 1999: Hydrologic, Water-Quality, and Geologic Effects of Hurricanes Dennis, Floyd, and Irene. U.S. Geological Survey (USGS) Water-Resources Investigations Report 00-4093. 2000. 55 pp. \$4.00, plus \$5.00 shipping. To order a copy, contact the USGS Information Services, Box 25286, Denver, CO 80225; (888) 275-8747; fax: (303) 202-4693; WWW: http://mapping.usgs.gov/esic/prices/other_publications.html.

In September and October 1999, the combined effects of hurricanes Dennis, Floyd, and Irene resulted in two months of flooding throughout eastern North Carolina. Flooding reached record levels, and 500-year or greater floods occurred in all of the state's river basins east of Raleigh. This report includes detailed information on the meteorological conditions that led to the flooding, the floods themselves, water-quality conditions during flooding, and the effects of the hurricanes on shoreline conditions.

Against the Tide: The Battle for America's Beaches. Cornelia Dean. 1999. 336 pp. \$24.95. To order a copy, contact Columbia University Press Order Department, 136 South Broadway, Irvington, NY 10533; (800) 944-8648 or (914) 591-9111; fax: (800) 944-1844 or (914) 591-9201; WWW: <http://www.columbia.edu/cu/cup/index.html>.

Extensive development cannot coexist with an eroding beach, and most American beaches are eroding, according to Cornelia Dean, author

of *Against the Tide* (and science editor of the *New York Times*). Dean wrote this book to urge Americans to reconsider our attitudes toward our beaches. She begins with the 1900 Galveston hurricane tragedy, where 20% of the city's population died, and notes that prior to the 20th century, very few people lived near a beach because it was too dangerous. Yet, almost half of all construction in the U.S. during the seventies and eighties took place in coastal areas, and 80% of Americans now live within an hour's drive of a coast. Dean describes numerous attempts to save beaches that resulted in their destruction and then addresses the physics of beaches and coastal ecology, unwise construction practices, public policy, and conservation issues. She also recommends practical steps to preserve our remaining stretches of pristine coastline and salvage others damaged by unwise construction.

Floods

Flood Hazards: Human, Riparian, and Aquatic Communities. Ellen E. Wohl, Editor. \$110.00. Copies are available from the Customer Service Department, Cambridge University Press, 110 Midland Avenue, Port Chester, NY 10573; (800) 872-7423; fax: (914) 937-4712; e-mail: orders@cup.org; WWW: <http://www.cup.org>.

As demographic changes increase pressure on river systems, it is imperative to understand the increasing hazards from natural and regulated flows along rivers. This volume provides a comprehensive review of existing knowledge on the subject. Three regions—the Colorado River basin of the U.S. and Mexico, the Tone River basin of Japan, and the lower drainages of the Ganges and Brahmaputra Rivers in Bangladesh—are used throughout as examples. The contributors to this volume examine inland flood hazards in general, physical controls of flooding, flood processes and effects on humans, biological flood processes, responses to flooding, and mitigation strategies.

Climate Change and El Niño

The Change in the Weather: People, Weather, and the Science of Climate. William K. Stevens. 2000. 382 pp. \$24.95. To purchase a copy or to locate a local bookseller that carries this volume, see <http://www.randomhouse.com/catalog>.

In *The Change in the Weather*, *New York Times* science reporter William Stevens asks such questions as: Are we indeed changing the climate? If so, how and what are the likely consequences? Stevens explains recent unusual weather in the context of a broader escalation of climate extremes and explores human relationships with climate, including the impacts of climate on cultures worldwide. He questions the viability of our climate in 50 years, particularly if we are still burning fossil fuels at the same rate as we did in the 20th century. He posits that carbon dioxide levels in the atmosphere may double, leading to a possible rise in heat-related deaths and weather disasters.

El Niño 1997-1998 in the Midwest. Stanley A. Changnon, Steven D. Hilberg, and Kenneth E. Kunkel. 2000. 68 pp. Free. To obtain a copy, contact Gloria Marsh, State Water Survey, 2204 Griffith Drive, Champaign, IL 61820-7495; fax: (217) 333-4983; e-mail: gloria@sws.uiuc.edu; WWW: <http://www.sws.uiuc.edu/pubs>.

During the summer of 1997, an anomalously warm El Niño event developed in the eastern tropical Pacific Ocean. Long-range forecasts were issued by the National Oceanic and Atmospheric Administration's Climate Prediction Center, warning that this event was expected to match or exceed the 1982-1983 El Niño, which, until that time, had been the strongest ever recorded. This report presents information gathered by the Midwestern Climate Center during the 1997-1998 event. It is divided into four sections that address predictive outlooks, the monthly and seasonal weather conditions during the El Niño, societal and economic impacts in the Midwest, and conclusions and recommendations.

Drought

Drought: A Global Assessment. Donald A. Wilhite, Editor. 2000. 752 pp., two-volume set. \$275.00. To purchase a copy, contact Routledge Customer Service, 7625 Empire Drive, Florence, KY 41042; (800) 634-7064; fax: (800) 248-4724; e-mail: cserve@routledge-ny.com; WWW: <http://www.routledge-ny.com>.

Drought may be the most complex of all natural hazards, resulting in serious economic, social, and environmental losses in both developed and

developing countries. Drought risks are escalating due to many factors, including increasing and shifting populations that intensify pressure on water and other natural resources. These volumes present a comprehensive overview of research on the physical and social dimensions of drought, including case studies of the most drought-prone countries. They cover new technology, drought planning methods, and effective mitigation activities from recent drought experiences worldwide. Following a general discussion of drought, the books are divided into seven additional parts that address causes and predictability; monitoring and early warning techniques; impacts and assessment methods; adjustment and adaptation strategies; policy, mitigation, and preparedness; links between drought and other issues; and conclusions and future challenges.

Earthquakes

Earthquake Hazard and Seismic Risk Reduction. Serguei Balassanian, Armando Cisternas, and Mikael Melkumyan, Editors. 2000. 460 pp. \$172.00. To purchase, contact Kluwer Academic Publishers, Order Department, P.O. Box 358, Accord Station, Hingham, MA 02048-0358; (781) 871-6600; fax: (781) 681-9045; e-mail: kluwer@wkap.com; WWW: <http://www.wkap.nl>.

In 1998, Armenia commemorated the 10th anniversary of the catastrophic Spitak earthquake by hosting the Second International Conference on Earthquake Hazard and Seismic Risk Reduction, bringing together over 400 participants from 43 countries to discuss current knowledge about reducing earthquake disasters. This volume contains the proceedings of that meeting and includes sections on disaster reduction and prevention, scientific understanding of earthquake hazard, and developments in earthquake engineering.

The Planning Process: Organized Preparation for Regional Disaster Planning. 2000. Free.

Yes! You CAN Survive an Earthquake. 2000. Free. Copies of both brochures can be requested from the Central United States Earthquake Consortium (CUSEC), 2630 East Holmes Road, Memphis, TN 38118-8001; (800) 824-5817; e-mail: cusec@ceri.memphis.edu; WWW: <http://www.cusec.org>.

The Planning Process discusses why organizations should develop a thorough, written disaster plan with the cooperation of community representatives, government officials, volunteer agencies, and the private sector. It describes essential steps for planning for earthquake and other natural hazard mitigation: hazard identification and risk assessment, development of seismic safety goals and policies, design of mitigation and preparedness strategies, program development, and creation of a plan and its evaluation. The *Yes! You CAN* brochure presents earthquake survival facts and information, including a summary of earthquake risk in the New Madrid Seismic Zone and a list of steps to take before, during, and after an earthquake occurs.

Slides

If you're looking for pictures of geophysical events, such as earthquakes, tsunamis, volcanoes, and hurricanes, the National Geophysical Data Center (NGDC) is the place to shop. They have an extensive collection of scientific and educational slides that illustrate, among other things, volcanic eruptions, earthquake damage, volcanoes, erosional landforms, faults, lava flows, and landslides. Three of their more recent additions include:

- *Düze, Turkey Earthquake, November 12, 1999.* 2000. 20 slides. \$25.00.
- *El Quindio, Colombia Earthquake, January 25, 1999.* 1999. 20 slides. \$25.00.
- *Izmit, Turkey Earthquake, August 17, 1999: Coastal Effects.* 2000. 20 slides. \$25.00.

For a complete list of their offerings, contact the NGDC, 325 Broadway, E/GC4, Boulder, CO 80303-3328; (303) 497-6826; fax: (303) 497-6513; e-mail: info@ngdc.noaa.gov; WWW: <http://www.ngdc.noaa.gov>.

Summary of Outreach Activities for California's Seismic Hazards Mapping Program: 1996-1998. Special Publication 121. 2000. 136 pp., plus 33" x 20" map. \$25.00. To obtain a copy, contact the California Division of Mines and Geology, Publication Sales, Desk W, 801 K Street, MS 14-33, Sacramento, CA 95814-3532; (916) 445-5716; fax: (916) 327-1853; WWW: http://www.consrv.ca.gov/dmg/pubs/pub_list/ordering.htm.

From 1996 through 1998, the California Department of Conservation's Division of Mines and Geology (DMG) developed and released 40 maps that identify areas where liquefaction and landslide hazards probably exist. These maps were distributed to affected cities and counties who in turn required site-specific investigations prior to approving most types of development and issuing permits. This report describes the methods DMG used to disseminate the maps and related information to jurisdictions, engineers, geologists, and real estate professionals that participate in implementing California's Seismic Hazard Mapping Act (SHMA). It contains sections on the need for this study, historical background, the SHMA of 1990, outreach activities and information aids, a survey of four local agencies, meetings with local governments and lessons learned, and conclusions and recommendations.

The DMG has also recently posted a "White Paper" on its Web site entitled, *An Evaluation of Future Earthquake Losses in California*. While stating that it is important for decision makers to have a detailed understanding of expected future losses from earthquakes, it notes that

two-thirds of the state's annual average earthquake loss is due solely to the Northridge quake, which occurred after 23 years of continued population growth and which ruptured directly beneath the San Fernando Valley. This paper presents the results of a statewide evaluation of potential earthquake losses. Its URL is: <http://www.consrv.ca.gov/dmg/>.

Volcanoes

Vulcan's Fury: Man Against the Volcano. Alwyn Scarth. 1999. 312 pp. \$29.95. Copies can be purchased from Yale University Press, Order Department, P.O. Box 209040, New Haven, CT 06520; (800) 987-7323; fax: (800) 777-9253; e-mail: custservice.press@yale.edu; WWW: <http://www.yale.edu/yup>.

This volume describes 15 of the most notable eruptions in human history. In 79 A.D., Vesuvius produced the most violent eruption in European history, while the 1669 Etna eruption marked the first known attempt to divert a lava-flow. The 1783 eruption of Laki killed a fifth of the population of Iceland, while the 1883 eruption of Krakatau drowned most of its victims and destroyed the island as well. Mount St. Helens razed thousands of acres of forest in 1980. Scarth reconstructs each disaster—its origins, explosion, and aftermath—drawing from eyewitness accounts and ancient texts (some appearing in English for the first time) to illustrate their impacts on humanity.

Richmond Debuts On-Line Crisis Management Certificate Program

In September, the University of Richmond began offering a 30-semester-hour undergraduate Certificate in Crisis Management program available entirely over the Internet. This venture expands access to the university's Emergency Services Management program, which has been offered since 1996.

The certificate courses have been chosen to provide working emergency managers with new skills and knowledge they can apply to their jobs; students can select courses that best enhance already completed training. (Fall 2000 offerings included "Introduction to Emergency Services Management," "Social Dimensions of Disasters," and a research practicum.) The university has recently completed an agreement with Thomas Edison State College of New Jersey that allows individuals completing the certificate to apply the courses toward Thomas Edison's degree in Emergency Disaster Management.

For more information about the Richmond program, contact *Walter G. Green III, School of Continuing Studies, University of Richmond, Richmond, VA 23173; (804) 289-8133; e-mail: wgreen@richmond.edu.*

International Graduate School in Earthquake Engineering to Open



A new international graduate school in earthquake engineering, based at the University of Pavia in Italy, will open in January 2001. The European School of Advanced Studies in Reduction of Seismic Risk (ROSE) has been launched to meet the increasing world demand for specialists in earthquake engineering and the attendant need for high-quality education of seismic hazard mitigation professionals and researchers. The director of the school is G. Michele Calvi, and the faculty includes academics and researchers from numerous institutions across Europe as well as several universities in the U.S. Further details about the program, including application forms and scholarship information, can be obtained from the ROSE School, Secretariat, Collegio Alessandro Volta, Via Ferrata, 27100 Pavia, Italy; tel: +39 0382-548735; fax: +39 0382-528422; e-mail: rose@unipv.it; WWW: <http://spadino.unipv.it/rose.html>.

[Adapted from the *Earthquake Engineering Research Institute Newsletter*, September 2000]

THE HAZARDS CENTER

The NATURAL HAZARDS RESEARCH AND APPLICATIONS INFORMATION CENTER was founded to strengthen communication among researchers and the individuals and organizations concerned with mitigating natural disasters. The center is funded by the National Science Foundation, Federal Emergency Management Agency, National Oceanic and Atmospheric Administration, U.S. Geological Survey, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Department of Transportation, U.S. Bureau of Reclamation, National Aeronautics and Space Administration, the Institute for Business and Home Safety, and the Public Entity Risk Institute. Please send information of potential interest to the readers of this newsletter to the address below. The deadline for the next *Observer* is November 22, 2000.

Center phone number (303) 492-6818
Fax (303) 492-2151
E-mail hazctr@spot.colorado.edu
Publications Clerk (303) 492-6819
E-mail janet.kroeckel@colorado.edu

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<http://www.colorado.edu/hazards>

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